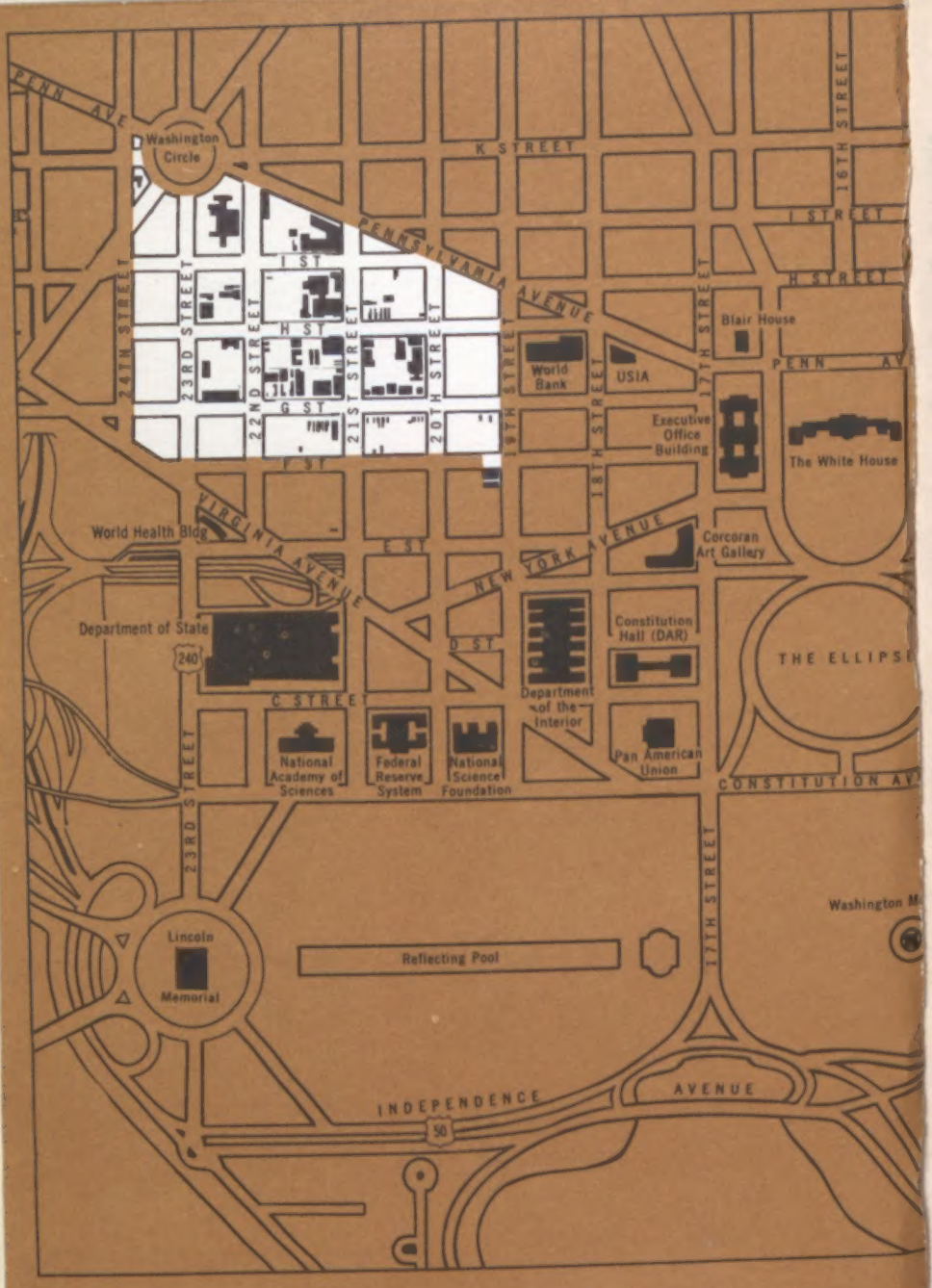
THE GEORGE WASHINGTON UNIVERSITY BULLETIN



UNDERGRADUATE AND GRADUATE CATALOGUE

1972-1973



THE GEORGE WASHINGTON UNIVERSITY CAMPUS / WASHINGTON, D.C.

THE GEORGE WASHINGTON UNIVERSITY BULLETIN
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THE GEORGE WASHINGTON UNIVERSITY BULLETIN

UNDERGRADUATE AND GRADUATE CATALOGUE 1972-73

Arts and Sciences, Education, Government and Business Administration, Public and International Affairs

This catalogue lists the programs and faculties of Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs.

It also contains information on the Division of University Students, in which students may register for University courses for credit or as auditors without pursuing degree programs.

For information concerning the University's programs and faculties in Engineering and Applied Science, Law, and Medicine, request the appropriate catalogue.

FACTS ABOUT GEORGE WASHINGTON UNIVERSITY

General Information	Private, nonsectarian, coeducational, founded 1821
Location	Washington, D. C., bounded by Pennsylvania Avenue and 19th, F, and 24th Streets, N.W.
Number of Students	15,190 (9,849 men, 5,341 women)
Number of Undergraduates	5,586 (2,974 men, 2,612 women)
Geographical Origin of Students	50 states, District of Columbia, 99 countries; 20% are from the Washington area
1972-73 Tuition	Undergraduate: $2,200 for two semesters; graduate: $80 for each semester hour (see page 30)
Number of Full-time Faculty	774 (77% with Doctoral degrees)
Number of Part-time Faculty	290 (includes some of the most distinguished men in Washington who serve as professorial lecturers)
Residence Hall Space	1,984 (an additional 2,000 students reside in fraternity houses, rooms, and apartments on or near the campus)
Room and Board	Cost varies from $1,380 to $1,505 for the academic year (see page 58)
Campus Organizations	130

Undergraduate majors: Accounting, American Civilization, American Literature, Anthropology, Applied Mathematics, Applied Statistics, Art History and Theory, Biology, Botany, Business Administration, Chemistry, Chinese Language and Literature, Chinese Studies, Civil Engineering, Classical Archeology and Anthropology, Classical Archeology and Greek, Classical Humanities, Dramatic Art, Economics, Electrical Engineering, Elementary Education, English Literature, Fine Arts, French Language and Literature, Geography, Geology, Germanic Languages and Literatures, History, International Affairs, International Business, Journalism, Latin, Latin American Studies, Mathematical Statistics, Mathematics, Mechanical Engineering, Medical Technology, Music (Applied, History and Literature, Theory), Philosophy, Physical Education, Physics, Political Science, Premedicine, Psychology, Public Affairs, Religion, Russian Language and Literature, Russian Literature and Culture—in Translation, Secondary Education, Sociology, Spanish American Literature, Spanish Language and Literature, Speech Communication, Speech Pathology and Audiology, Zoology.

Study leading to graduate or professional degrees is offered in the Graduate School of Arts and Sciences, the National Law Center, the School of Medicine, the School of Engineering and Applied Science, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs.

UNIVERSITIES are undergoing change, either drastically or slowly, as they have been for centuries. Whatever the changes, the one premise on which universities are based remains constant: universities are for learning —for acquiring learning, for transmitting learning, and for the exploration that yields new learning. Any other objective is unworthy of a university, and any other purpose is incompatible with the student and his relationship to the institution.

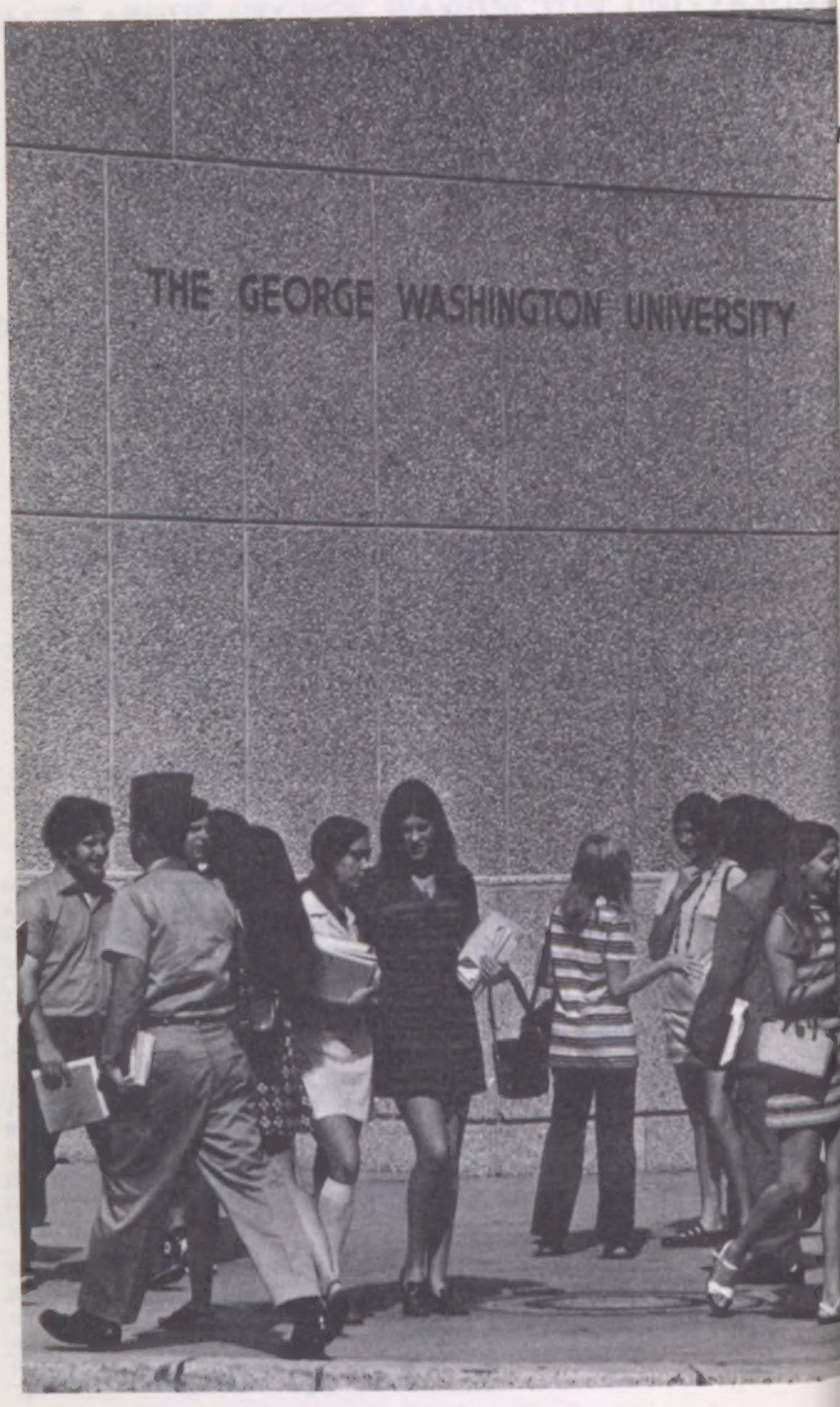
The faculty, through scholarship and research, extends learning, and it transmits learning by teaching. The student learns from the faculty, the library, and the laboratory—if he accepts, as he must accept, learning as his objective. This learning does not take place in a vacuum; in addition to the particular content of learning, the student will develop certain habits of mind—analytical thinking, powers of insight, self-examination, and the use of rational discourse—that will serve him throughout his personal and professional life.

Within this basic context, George Washington University invites the student to take up his residence in order that his energies, interests, and talents may be directed to learning.

Exceptional opportunities for learning are made possible because of the University's location in the heart of the nation's capital. For example, cooperative programs are conducted in various fields of study with members of Congress, the Smithsonian Institution, the Library of Congress, the National Gallery of Art, and other federal and private organizations. In addition to these programs, Washington presents opportunities for observation, study, service, and recreation limited only by the student's time, energy, and imagination.

In this atmosphere, George Washington University seeks to provide a matrix for learning not available in the standard university education, so that no graduate can ever forget that as a student he was at the center of things and that he must forever carry additional responsibility in and for society, because of the opportunity that was his.

LLOYD H. ELLIOTT
President
The George Washington University


THE GEORGE WASHINGTON UNIVERSITY

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THE CALENDAR 1972–73*

1972 1973

SEPTEMBER

S	M	T	W	T	F	S
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OCTOBER

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JUNE

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JULY

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AUGUST

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19	20	21	22	23	24	25
26	27	28	29	30	31	

1972 FALL SEMESTER

September 1 Orientation for students from foreign countries *Friday*

September 5 Placement tests and advising for entering freshmen who did not attend Summer Advance Registration sessions *Tuesday*

September 5–6 Advising *Tuesday–Wednesday*

September 6 Placement tests and advising for transfer students *Wednesday*

September 6 University Faculty Assembly Meeting *Wednesday*

†*September 7–9* Registration *Thursday–Saturday*
Application for February graduation due as part of registration

September 9–10 Activities for new students *Saturday–Sunday*

September 11 Classes begin *Monday*

September 29 Application for October Ed.D. Comprehensive Examinations due *Friday*

October 6 School of Public and International Affairs Faculty Meeting *Friday*

*This calendar is subject to change.
†Registration is conducted alphabetically according to the first letter of the student's surname. The alphabetical breakdown and the hours of registration will be stated in the *Schedule of Classes*, which is available well in advance of each semester.

October 11	Columbian College of Arts and Sciences Faculty Mee ing *Wednesday*
October 18	Application for School of Public and Internationa Affairs November Master's Comprehensive Examinatio due *Wednesday*
October 19	Board of Trustees Meeting *Thursday*
October 28	Ed.D. Comprehensive Examinations *Saturday*
November 3	Application for December Ed.D., Ed.S., and M.A. Ed. Comprehensive Examinations due *Friday*
November 11	National Teacher Examinations *Saturday*
November 17–18	School of Public and International Affairs Maste Comprehensive Examinations *Friday–Saturday*
November 22	Thanksgiving recess begins after last class *Wednesda*
November 27	Classes resume *Monday*
December 1	School of Public and International Affairs Faculty Mee ing *Friday*
December 1–2	School of Government and Business Administratio Master's Comprehensive Examinations *Friday–Saturda*
December 4	D.B.A., D.P.A., and Ph.D. Dissertations of Februar candidates due *Monday*
December 7	Last day of fall-semester classes *Thursday*
December 9	Ed.D., Ed.S., and M.A. in Ed. Comprehensive Exam nations *Saturday*
December 13–22	Examination period *Wednesday–Friday*
January 2	Master's Theses of February candidates due *Tuesday*
January 3	Columbian College of Arts and Sciences Faculty Mee ing *Wednesday*
January 8	Ed.D. Dissertations of February candidates due *Monda*
1973	**SPRING SEMESTER**
January 9	Placement tests *Tuesday*
January 9–10	Advising for freshmen, sophomores, and all new studen *Tuesday–Wednesday*
**January 11–13*	Registration *Thursday–Saturday* Application for May graduation due as part of registra tion
January 15	Spring-semester classes begin *Monday*
January 18	Board of Trustees Meeting *Thursday*
January 20	Inauguration Day (holiday) *Saturday*
January 30	University Faculty Assembly Meeting *Tuesday*
February 2	School of Public and International Affairs Faculty Mee ing *Friday*
February 19	Winter Convocation (holiday) *Monday*
March 2	Columbian College of Arts and Sciences Faculty Mee ing *Friday*
March 9	Application for School of Public and International A fairs Master's Comprehensive Examinations due *Frida*

* Registration is conducted alphabetically according to the first letter of the student's surname. Th alphabetical breakdown and the hours of registration will be stated in the *Schedule of Classes*, whic is available well in advance of each semester.

March 10	Spring recess begins after last class *Saturday*
March 15	Board of Trustees Meeting *Thursday*
March 19	Classes resume *Monday*
March 19	Application for April Ed.D., Ed.S., and M.A. in Ed. Comprehensive Examinations due *Monday*
March 27	D.B.A., D.P.A., and Ph.D. Dissertations of May candidates due *Tuesday*
April 7	National Teacher Examinations *Saturday*
April 13–14	School of Government and Business Administration and School of Public and International Affairs Master's Comprehensive Examinations *Friday–Saturday*
April 16	Ed.D. Dissertations and Master's Theses (other than those in the School of Public and International Affairs) of May candidates due *Monday*
April 20	Last day of spring–semester classes *Friday*
April 20	Master's Theses of May candidates in the School of Public and International Affairs due *Friday*
April 21	Ed.D., Ed.S., and M.A. in Ed. Comprehensive Examinations *Saturday*
April 26–May 5	Examination period *Thursday–Saturday*
May 2	Columbian College of Arts and Sciences Faculty Meeting *Wednesday*
May 4	School of Public and International Affairs Faculty Meeting *Friday*
May 6	Commencement *Sunday*
May 17	Board of Trustees Annual Meeting *Thursday*

1978 SUMMER SESSIONS

June 11	Registration for first 5-week session and first 3-week Education workshop *Monday*
June 12	First 5-week session and first 3-week Education workshop classes begin *Tuesday*
June 29	First 3-week Education workshop ends *Friday*
July 2	Registration and beginning of classes for second 3-week Education workshop and 6-week Education session *Monday*
July 4	Holiday *Wednesday*
July 18	First 5-week session ends *Wednesday*
July 19	Registration for second 5-week session *Thursday*
July 20	Second 5-week session classes begin *Friday*
July 20	Second 3-week Education workshop ends *Friday*
July 23	Registration and beginning of classes for third 3-week Education workshop *Monday*
August 10	Third 3-week Education workshop and 6-week Education session end *Friday*
August 24	Second 5-week session ends *Friday*

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August 24	Second 5-week session ends *Friday*



Former United States Chief Justice Earl Warren served as Edgar R. Baker Adjunc Professor in the University's School of Public and International Affairs in the Fal Semester of 1970-71.

THE UNIVERSITY

HISTORY

THE GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted upon the establishment of a National University in the federal city. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company, "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian Univer-

sity period, the buildings of the University were situated along H Street be tween Thirteenth and Fifteenth Streets. The Medical School group still re mains there.

During the last half century the University's present plant has been devel oped in that section of the old First Ward familiarly known as "Foggy Bot tom," between Nineteenth and Twenty-fourth Streets, south of Pennsylvani Avenue. The area is not without its reminders of historic interest to the Uni versity. President Monroe, who signed the Charter, lived at 2017 Eye Street The first President of the Board of Trustees, the Reverend Obadiah B. Brown was for fifty years the pastor of a church at Nineteenth and Eye Streets, an Washington selected Twenty-third and E Streets as the site of the Nationa University he hoped to see established.

PURPOSE AND OBJECTIVES

The purpose of The George Washington University was to realize "the aspira tions of Washington, Jefferson, and Madison, for the erection of a universit at the seat of the Federal Government." Over the years it has been the aim t develop the University ideal in the Nation's Capital with a view toward meet ing the changing needs of society while continuing to pursue the traditiona principles of learning and research.

The George Washington University now rededicates itself and all the re sources at its command to the pursuit of knowledge and its dissemination. To this end:

The University recognizes its special opportunities in and obligations to on of the principal capitals of the world. It is a primary objective of the Univer sity to utilize its historical, geographical, and functional relationship to th Nation's Capital and the Washington community in continuing the develop ment of a great nationally and internationally oriented university.

The University recognizes the needs of our times and accepts the challeng to develop each student's potential abilities to the fullest extent.

The University is and should remain privately controlled, nonsectarian, an co-educational.

Admission to the University is determined only in terms of the persona character and academic qualifications of the candidates.

A broadly based liberal education is fundamental to the total program o the University.

Expansion of graduate and professional studies and research and the utiliza tion for this purpose of the excellent research facilities and materials availabl in the Nation's Capital are basic to the continuous development of the Univer sity's educational program.

The provision of superior instruction and facilities and the application o high standards of entrance qualifications and academic achievement to all stu dents whether full-time or part-time, on-campus or off-campus, are major mis sions of the University.

A balanced program of student extracurricular activities is an integral par of the University program.

The University will continue to strive to meet the evident needs of an en larged student body while governing the size of enrollment by its capacity t supply adequate staff and facilities for the excellent teaching and research which it espouses.

THE COLLEGES, SCHOOLS, AND DIVISIONS

George Washington University includes eleven colleges, schools, and divisions, as follows:

*Columbian College of Arts and Sciences** offers four-year programs in the arts and sciences leading to the degrees of Bachelor of Arts, Bachelor of Science, and (in cooperation with the Department of Pathology and the University Hospital) Bachelor of Science in Medical Technology. The College also provides the prelegal and premedical programs, and the preprofessional work required for admission to the School of Education and to the School of Public and International Affairs. Columbian College has academic jurisdiction over the off-campus programs leading to the degrees of Associate in Arts in General Studies, Bachelor of General Studies, Bachelor of Science in Environmental Health, Bachelor of Science in Geodetic and Cartographic Science, and Bachelor of Science in Oceanography. These off-campus programs are administered by the College of General Studies.

The Graduate School of Arts and Sciences† offers advanced study and research leading to the degrees of Master of Arts, Master of Arts in Special Studies, Master of Fine Arts, Master of Music, Master of Science, Master of Science in Forensic Science, Master of Science in Special Studies, Master of Science for Teachers, and Doctor of Philosophy. The degrees of Master of Arts in Special Studies and Master of Science in Special Studies are also available through off-campus programs administered by the College of General Studies.

The School of Medicine†† offers work leading to the degree of Doctor of Medicine.

The National Law Center offers courses leading to the degrees of Juris Doctor, Master of Laws, Master of Comparative Law, Master of Comparative Law (American Practice), and Doctor of Juridical Science; and special programs in Continuing Legal Education.

The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: Civil Engineering, Electrical Engineering, and Mechanical Engineering. Graduate programs lead to the degrees of Master of Science, Master of Engineering Administration, and Doctor of Science. The School has academic jurisdiction over the off-campus programs leading to the degrees of Master of Science and Master of Engineering Administration. These off-campus programs are administered by the College of General Studies.

The School of Education offers undergraduate programs leading to the degrees of Bachelor of Arts in Education and Bachelor of Science in Physical Education; graduate studies leading to the degrees of Master of Arts in Education, Master of Arts in Teaching, Education Specialist, and Doctor of Education. The degree of Master of Arts in Education is also available through off-campus programs administered by the College of General Studies.

The School of Government and Business Administration offers undergraduate programs leading to the degree of Bachelor of Business Administration and graduate programs leading to the degrees of Master of Arts in Government,

* Columbian College of Arts and Sciences cooperates with the School of Medicine in offering a program leading to the combined degrees of Bachelor of Arts and Doctor of Medicine.
† The Graduate School of Arts and Sciences cooperates with the School of Medicine in offering a program leading to the combined degrees of Master of Science and Doctor of Medicine and a dual program leading to the degrees of Doctor of Medicine and Doctor of Philosophy.

Master of Arts in Health Care Administration, Master of Business Administr tion, Master of Public Administration, Master of Urban and Regional Pla ning; the Post-Master's Graduate Certificate in Health Care Administratio the degrees of Doctor of Business Administration and Doctor of Public A ministration. The School also has academic jurisdiction over off-campus pr grams leading to the degrees of Bachelor of Science in Administration a Master of Science in Administration. These off-campus programs are a ministered by the College of General Studies.

The School of Public and International Affairs offers undergraduate pr grams leading to the degree of Bachelor of Arts and graduate programs leadi to the degree of Master of Arts. The School also offers an off-campus progra leading to the degree of Master of Science in International Affairs.

The College of General Studies supplements the adult education program the University through campus and off-campus study; conferences, seminar and special projects; and continuing education and noncredit programs. Th College also administers the off-campus programs over which Columbian Co lege of Arts and Sciences, the Graduate School of Arts and Sciences, the Scho of Engineering and Applied Science, the School of Education, and the Scho of Government and Business Administration have academic jurisdiction.

The Division of University Students makes available courses for students n candidates for degrees in this University.

The Summer Sessions.

ACADEMIC STATUS

George Washington University is accredited by its regional accrediting agenc the Middle States Association of Colleges and Secondary Schools.

The University is on the approved list of the American Association of Un versity Women and is a member of the College Entrance Examination Boar

The National Law Center is a charter member of the Association of Amer can Law Schools and is approved by the Section of Legal Education and Ad missions to the Bar of the American Bar Association. The School of Medicin is a member of the Association of American Medical Colleges and is one o the medical colleges which have been continuously approved by the America Medical Association. Curricula of the School of Engineering and Applied Sci ence in Civil, Electrical, and Mechanical Engineering are accredited by th Engineers' Council for Professional Development. The School of Education i a charter member of the American Association of Colleges for Teacher Edu cation and is accredited by the National Council for Accreditation of Teache Education for its Bachelor's and Master's degree programs. The School o Government and Business Administration has maintained full membership i the Middle Atlantic Association of Colleges of Business Administration sinc 1961. It joined the Council on Graduate Education for Public Administratio in 1966. By invitation, in 1968, the School became a charter academic mem ber of the American Association of Collegiate Schools of Business Assembly The programs in Public Accounting designed to prepare students for Certifie Public Accountants examinations have been approved by the state boards o New York and of Maryland. The program in Hospital Administration is ac credited by the National Accrediting Commission on Graduate Education fo Hospital Administration. The Department of Chemistry is on the approved lis of the American Chemical Society. The graduate program in clinical psycholog

in the Department of Psychology is on the approved list of the American Psychological Association. The program in speech pathology and audiology is accredited by the Education and Training Board of the American Boards of Examiners in Speech Pathology and Audiology.

LOCATION

The University is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the United States Information Agency, the Corcoran Gallery of Art, the Department of State, the Department of the Interior, the General Services Administration, the National Academy of Sciences, and the Kennedy Center for the Performing Arts.

GOVERNMENT

The University is privately endowed and is governed by a self-perpetuating Board of Trustees of which the President of the University is an ex officio member. The members of the Board are named for a period of three years and are divided into three classes. The members of one class are elected at each annual meeting to fill the places of the members whose terms of office expire. Two members of each class are nominated by the Alumni Association.

THE UNIVERSITY LIBRARIES

The Library collections of the University are housed in the University Library, the general library of the University, and in the departmental libraries of law and medicine.

These collections contain over 545,000 volumes—about 386,000 in the University Library, about 114,000 in the Law Library, and about 47,000 in the Medical Library. Approximately 30,000 volumes a year are added to the Library's resources. Endowments supplementing the University appropriation provide books in the fields of American civilization, American literature, foreign service, history, public finance, and the social sciences; and gifts from many sources have enriched the collections. The Libraries currently receive about 5,000 periodicals.

Information concerning the use of the Libraries may be obtained at the Library service desks.

The Library is administered for the curricular, reference, and recreational needs and interests of the students. Instruction in the use of the library is given upon request by the reference librarians. The Library endeavors to assist students and all members of the University to use the rich library resources of Washington and the unusual opportunities they offer for extensive research. Interlibrary loan arrangements are maintained with other libraries in the city and throughout the United States.

The student has access to the Library of Congress, the Public Library of the District of Columbia and its branches, the libraries of the Pan American Union, the Bureau of Railway Economics, the U.S. Department of Agriculture, the Smithsonian Institution, the National Library of Medicine, and many of the other great special collections of the government departments. Full-time graduate students at George Washington University may, upon application, be

issued a Consortium library card which permits direct borrowing from t libraries of the other Consortium institutions.

Except during the summer, intersession, and vacation periods, the hours the University Library are Monday through Friday, 8:30 a.m. to 12:00 m night; Saturday, 9:00 a.m. to 6:00 p.m.; Sunday, 1:00 p.m. to 12:00 m night. The Law Library is open Monday through Friday, 8:00 a.m. to 12: midnight; Saturday and Sunday, 9:00 a.m. to 12:00 midnight. The Medi Library is open Monday through Friday, 7:30 a.m. to 10:00 p.m.; Saturd 8:30 a.m. to 5:00 p.m.; Sunday, 12:00 noon to 5:00 p.m.

THE BOARD OF TRUSTEES OF THE UNIVERSITY

The President of the University is an ex officio member of the Board of Tr tees.

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atson W. Wise, Ph.B.

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cob Burns, LL.B., LL.D.
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Nominated by the alumni.

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* The President of the University, the Vice President for Academic Affairs, the Registrar of University, the Director of Admissions of the University, and the Director of University Libraries ex officio members of all faculties of the colleges and schools of the University.

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COMMITTEES OF THE UNIVERSITY 1971–72

COMMITTEE ON ACADEMIC POLICY

The Committee on Academic Policy, whose Chairman is the Vice Preside Academic Affairs, is composed of the following members: the deans colleges, schools, and divisions; the Chairman of the Executive Commit the Faculty Senate; the Vice President and Treasurer; the Vice Preside Development; the Vice President for Administration; the Vice Preside Policy Studies and Special Projects; the Vice President for Student Affai Medical Director of the University Hospital; the Medical Director of th versity Clinic; the Assistant Vice President for Academic Affairs; the As Vice President for Research; the Assistant Vice President and Assistant urer; the Assistant Treasurer and Director of the Office of Student Fin Aid; the Registrar; the Director of Admissions; the Director of the Budg Comptroller; the Director of Public Relations; the Dean of Students; the ness Manager; the Director of Personnel Services; the Administrato Clinical Affairs; the Director of Libraries; the Director of the Cloyd Heck vin Center; the Director of Athletics; a representative of Student Govern and a student representative of Phi Beta Kappa.

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Student Members

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Grover LaMarr Angel
Otto Bergmann
*Harold Frederick Bright
*Arthur Edward Burns
Daniel Raymond Cloutier
Roderic Hollett Davison
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*James Carlton Dockeray
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*Lloyd Hartman Elliott
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Herman Hedberg Hobbs
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Norman Clifford Kramer
*Robert Kramer
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†Howard Clemeth Pierpont
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*Burton Sapin
Robert Poindexter Sharkey
*Rodney Tillman
George Vartkes Vahouny
Reuben Esselstyn Wood

Russell Bennett Stevenson, Jr., *Parliamentarian*

* Ex officio member.
† Chairman of the Executive Committee.

GENERAL INFORMATION

Admission

UNIVERSITY ACCEPTS BOTH MEN AND WOMEN. Students are admitted at the nning of each semester and summer session.

ıe right is reserved to refuse admission to any student with an academic rd which creates doubt of his ability to succeed in college or who, for any reason, would not be an acceptable student.

ı application for admission to degree candidacy should be accompanied by 5 application fee.* The application fee is waived for a student applying eadmission who was registered as a degree candidate at the time of his last tration at this University and who has not since registered at another in- ion.

pplicants are urged to submit the application form and complete creden- well in advance of the semester for which they seek admission.

ll credentials submitted in support of an application are treated confiden- and the contents are disclosed only to authorized individuals. Such cre- ials become the property of the University and cannot be returned.

UNDERGRADUATE ADMISSION†

ms for application for admission or readmission are available at and should eturned to the Office of Admissions, George Washington University, Wash- on, D.C. 20006.

ONDARY SCHOOL STUDENTS

egular Admission.—Applicants for regular admission who wish to begin ege in the fall semester or in either the first or second term of the summer ion *should* apply during the fall term of the senior year in high school. ference will be given to students who submit applications and required cre- tials prior to March 1. Students graduating at mid-year who wish to begin ege in the spring semester *must* apply no later than December 1.

n applicant from a secondary school must arrange to have sent directly n his school to the Office of Admissions a complete academic record to- ıer with a personal evaluation and recommendation from his principal. This

plication fee must be by check or postal money order, payable to George Washington University. detailed admission requirements, see the appropriate college or school in this Catalogue. Tests red for admission and Educational Testing Service information are described on pages 72 and 136. pages 27-28 for admission requirements for students from foreign institutions.

information may be supplied on a form provided by the University standard form used by the secondary school, provided all essential infor is included.

Early Decision Plan.—To be eligible for an early decision, a studen certify that George Washington University is his first-choice school an he will accept an offer of admission if it is extended, provided it includ quate financial aid if such is needed. He must also notify all other at which he has initiated applications that he is withdrawing his appl The application, all required credentials, and, when appropriate, the appl for financial aid must be in the Office of Admissions early in the fall later than November 1. A decision will be mailed by December 1. The d tion of intent to attend the University and a $100 tuition deposit (p additional $100 housing deposit for resident students), nonrefundable be submitted by December 15.

TRANSFER STUDENTS

Undergraduate transfer students from other institutions should submit a tion and required credentials prior to June 1 for the fall semester, Dec 1 for the spring semester, May 1 for the first summer session, and June the second summer session.

The transfer student must be in good standing as to scholarship and co He must be eligible to return to the last previously attended institution semester for which he seeks admission to this University.

An applicant who has attended one or more institutions of higher le must request *each* registrar to mail directly *to the Office of Admissions* script of his record, *even though credits were not earned.*

If high school units are not shown on the college transcript, the ap should request his high school to submit a transcript to the Office of Admi

If an applicant has fewer than 30 semester hours of acceptable work better on academic work from an accredited institution at the time the cation is submitted), he must request that his high school record and C Entrance Examination Board test scores be sent to the Office of Admissi

TUITION DEPOSIT

Upon notification of acceptance, a $100 tuition deposit will be required full-time undergraduate students including those readmitted. The dep credited toward tuition and is not refundable.

ADVANCED STANDING AND ADVANCED PLACEMENT

CREDIT BY EXAMINATION

Assuming there is no duplication of course credit earned, a maximum semester hours of credit may be assigned for each or any combination following methods:

COLLEGE ENTRANCE EXAMINATION BOARD ADVANCED PLACEMENT TESTS

Credit is assigned for examinations passed with scores of 4 or 5 on the of a score report sent to the Office of Admissions from the Educational T

at the student's request. Examinations passed with grade of 3 will be red for credit or placement if the student arranges to have the examina- per sent to the Office of Admissions. The Advanced Placement Tests ninistered in the secondary school in May of each year. Normally only s who complete a course designated as Advanced Placement are pre- for the examination. Arrangements for the examination are the re- ility of the applicant and should be made with the Program Director, Entrance Examination Board Advanced Placement Examinations, Box rinceton, N.J. 08540.

GE ENTRANCE EXAMINATION BOARD COLLEGE-LEVEL EXAMINATION PRO- (CLEP)

is assigned for both the General and Subject-Matter Examinations passed 50th percentile or above (college sophomore norms) with the following ions applying to the General Examinations: (1) a student must have ut of secondary school for three or more years to be eligible for credit 2) no credit will be assigned for the English Composition examination. gements for the examination are the responsibility of the applicant and be made with the College Entrance Examination Board College-Level nation Program, Box 1821, Princeton, N.J. 08540.

MBIAN COLLEGE OF ARTS AND SCIENCES SPECIAL DEPARTMENT EXAMINA-

dent may request permission from any of the academic departments to an examination prepared by the department in a specific subject. Per- n is not automatically granted; the student must offer evidence that he ufficient background to have a reasonable command of the subject- r. Awarding of credit for the examinations will be based on the depart- evaluation of the examination paper.

T FROM HIGHER INSTITUTIONS

nced standing may be granted for work successfully completed at accred- nstitutions of higher learning. Credit will be granted for transferred work when it meets the requirements for the degree sought at this University. y be allowed provisionally. Work of low pass grade (*D* or the equivalent) ot be considered for transfer.

T FOR SERVICE SCHOOLS

nited amount of credit may be assigned for selected service school in- ion received since 1941. No more than 30 semester hours may be assigned combination of service schools and examinations referred to above. ans should submit to the Office of Admissions photostatic copies of their e school records, indicating courses successfully completed with sufficient fication of the course to locate it in the *Guide to Evaluation of Educa- Experience in the Armed Forces.*

ADVANCED PLACEMENT

Advanced placement or waiver of a requirement will be granted on the scores on Achievement Tests of the College Entrance Examination E follows:

Achievement Test	Minimum Score	Exemption
English Composition	650	Waives Engl 1
English Composition	680	Waives Engl 2 or 4
European and/or American History	600	Waives Hist 39-40, and/or 71-72
French	650	Waives a two-year l requirement
German	600	
Hebrew	600	
Latin	600	
Russian	700	
Spanish	650	

GRADUATE ADMISSION*

Graduate School of Arts and Sciences.—Forms for application for ad or readmission are available at the Office of the Dean of the Graduate of Arts and Sciences, George Washington University, Washington, D.C. Completed applications and all supporting credentials must be in the O the Dean by February 15 for fall admission and for fellowship consid and by November 1 for spring admission. Applications and credenti ceived after February 15 are not guaranteed consideration, and admissi be on a space-available basis only. Application files completed after N will not be considered for the fall semester.

School of Education.—Forms for application for admission or readi are available at the Office of the Dean of the School of Education, Washington University, Washington, D.C. 20006. When completed, th plication forms should be submitted to this Office no later than June 1 fall semester, November 1 for the spring semester, April 1 for the summ sions.

School of Government and Business Administration.—Forms for appl for admission or readmission are available at the office of the Admissio cer, School of Government and Business Administration, George Wash University, Washington, D.C. 20006. When completed, these application should be submitted to this Office no later than July 1 for the fall se December 1 for the spring semester, May 1 for the first summer sessio June 1 for the second summer session.

School of Public and International Affairs.—Forms for application f mission or readmission are available at the Graduate Admissions Office, of Public and International Affairs, George Washington University, Washi D.C. 20006. When completed, these application forms should be sub to this Office no later than March 1 (February 1 for applicants for gr assistantships and foreign applicants). Admission is for the fall semester

* For detailed admission requirements, see the appropriate college or school in this Catalog pages 27-28 for admission requirements for students from foreign institutions.

dentials, including transcripts from all institutions attended, Graduate Examination scores, and letters of reference, must be received before dline date.

DIVISION OF UNIVERSITY STUDENTS ADMISSION*

for application for admission to *nondegree* status in the Division of sity Students are available at and should be returned to the Office of sions, George Washington University, Washington, D.C. 20006. When ted, these application forms, with credentials when required, should be d by the Office of Admissions no later than the Friday before the first registration (see Calendar, pages 7-9). No application fee is charged cess an application for admission to this Division. For detailed entrance ements, see pages 176–77.

istration in a given course may be denied students in this Division when s needed for degree candidates.

READMISSION

dent previously registered in the University who was not registered on s during the immediately preceding semester (summer session excluded), apply for readmission. Final dates for applying are the same as those for rgraduate Admission" (see pages 23-26), or "Graduate Admission" (see 26-27). If the student applies as a degree candidate and was previously ered as a nondegree student, or if he has attended one or more higher tions during his absence from the University, he must have complete l transcripts sent to the appropriate office at this University from each tion attended. Applications for readmission are considered on the basis gulations currently effective.

e application fee is waived for a student applying for readmission who egistered as a degree candidate at the time of his last registration at this rsity and who has not since registered at another institution.

STUDENTS FROM FOREIGN INSTITUTIONS†

ication, required records, and scores on the *Test of English as a Foreign uage* (see page 28) must be received from *foreign applicants* no later than h 1 (February 1 for applicants for graduate study in the School of Public International Affairs) for the fall semester and November 1 for the spring ster.

IRED RECORDS

icants must request all educational institutions attended to send *directly* to ppropriate office (see "Undergraduate Admission," pages 23-26, or "Grad- Admission," pages 26-27) official credentials listing subjects studied, grades

this page and the following for admissions requirements for students from foreign institutions. detailed admission requirements, see the appropriate college or school in this Catalogue. Tests ed for admission and Educational Testing Service information are described on pages 72, ud 176.

received, examinations taken, and degrees received. Certified cop
plomas and certificates from secondary schools and all colleges and u
attended are required. Records of state examinations and certificate
needed. All records become the property of the University and *cann*
turned.

LANGUAGE TEST

Students whose native tongue is not English are required to take th
English as a Foreign Language. Students are responsible for making
ments for taking the test and should address inquiries to: TOEFL, Ed
Testing Service, Princeton, New Jersey 08540, U.S.A. The completed
tion form should be returned to the Testing Service at Princeton we
vance of the beginning of the semester for which the applicant seeks a
The test fee, which should be remitted with the application, entitles th
to have his test score sent to three different institutions. Registration
Test of English as a Foreign Language does *not* constitute application
mission to George Washington University.

The Bulletin of Information, obtainable without charge, contains a
tion of the test as well as rules regarding application, fees, reports,
conduct of the test; lists of examination centers; examination dates;
application blank. On the application for the test, the student should
that the scores be sent to the appropriate office at this University (see "
graduate Admission," pages 23-26, or "Graduate Admission," pages

If additional tests are prescribed, necessary instructions will be sent
applicant.

TRANSFER WITHIN THE UNIVERSITY

For information concerning transfer from one college, school, or divi
another within the University, see page 48.

Registration

THE DATES, HOURS, AND PLACE OF REGISTRATION will be stated in the *Sch*
of Classes, which is available well in advance of each semester.

A student cannot register for classes until he has received a letter of a
sion to the University issued by the appropriate admitting office.

No registration is accepted for less than a semester or one summer se

A student may not register concurrently in this University and another
tution without the prior permission of the dean of the college, school, or
sion in which he is registered in this University. Registration in more tha
college, school, or division of the University requires the written permissi
the deans concerned, *prior to registration*. Allowance of credit for work
concurrently at another institution is at the discretion of the appropriate
mittee.

ILITY FOR REGISTRATION

ation for the following categories of campus students is held on the days stration stated in the University Calendar. A student who is suspended se record is not clear for any reason is not eligible to register. Registra- a given course may be denied students in the Division of University s when space is needed for degree candidates.

Student.—Upon receipt of a letter of admission, the new student is for registration on the stated days of registration.

dmitted Student.—A student previously registered in the University who t registered for campus courses during the preceding semester or sum- ssion must apply for and receive a letter of readmission from the appro- admitting office before he is eligible for registration. A student registered e spring semester of 1972 need not apply for readmission for the fall er of 1972. Such a student is a "Continuing Student."

tinuing Student.—The student registered for campus courses in the im- tely preceding semester of the academic year is eligible to register upon tation of his student identification card from the previous semester. The t registered for the 1972 Summer Sessions campus courses, and not re- d to summer registration, is eligible to register for the 1972 fall se- r on presentation of his 1972 Summer Sessions student identification card.

TRATION CHANGES AND WITHDRAWALS (see pages 33-34, 48)

TRATION FOR CONSORTIUM COURSES

nts interested in taking courses at any of the other institutions in the ortium of Universities of the Washington Metropolitan Area, Inc. (see 53), should consult the program announcements of the other institu- Consortium application forms and instructions are available from the trar after the student has obtained his registration packet. In order to cipate in the Consortium program (1) the graduate student must obtain pproval of his adviser and should ascertain from the department of the tution where the course is taught whether or not he is eligible for the se and whether there is a space in the class *or* (2) the undergraduate stu- must obtain the approval of his adviser and *must* ascertain from the de- ment of the institution where the course is taught whether or not he is ble for the course and whether there is space in the class. Specific in- es should be addressed to the Registrar.

Fees and Financial Regulations

S PAID BY STUDENTS cover only a portion of the cost of the operation of University. Income from endowment funds, grants, and gifts from alumni friends of the institution make up the difference.

he following fees and financial regulations were adopted for the academic 1972-73. (See page 32 for projected tuition increases for 1973-76.)

Tuition Fees

For undergraduate study in Columbian College of Arts and Sciences, the S
Education, the School of Government and Business Administration, the S
Public and International Affairs; for study in the Division of University
and for courses taken on campus by undergraduate students in the College
eral Studies:

Full-time program (12 to 18 hours), each semester .....
*Part-time program or hours in excess of 18, for each semester hour

For graduate study† in the Graduate School of Arts and Sciences, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs; and for courses taken on campus by graduate students in the College of General Studies (Exception: doctoral students registered prior to July 1, 1967, who wish to continue payments according to the plan (see below) in effect prior to that date):

*For each semester hour for which a student registers .....

For students registered for doctoral degrees‡ in the Graduate Council (now the Graduate School of Arts and Sciences) and the School of Government and Business Administration prior to July 1, 1967, who wish to continue payments according to the plan in effect prior to that date:

For work leading to and including the general examination
For work leading to and including the final examination

For students registered for the Doctor of Education degree§ prior to July 1, 1967, who wish to continue payments according to the plan in effect prior to that date:

For work leading to and including the major field examination
For work leading to and including the final examination

University Center Fee (charged all students registered on campus,# nonrefu

For students registered for 11 or more semester hours on campus:
Each semester

For students registered for less than 11 semester hours in a semester on campus:
For each semester hour for which the student registers

For students maintaining "continuous registration" status:
Each semester .....

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* For courses offered by the School of Engineering and Applied Science and the Natio
Center, the fee for each semester hour is $82.00.
† Payment of tuition for a Master's thesis entitles the candidate, during the period of res
to the advice and direction of the member of the faculty under whom the thesis is to be
In case a thesis is unfinished, additional time may be granted in accordance with the regula
the school in which the student is registered.
‡ The tuition fee is to be paid at the rate of $550 a semester or in full at the beginning
stage of the doctoral discipline. No "continuous registration" fee will be charged if a th
is needed for completion of either part of the degree requirements. If still more time is
the student must maintain continuous registration and pay the continuous registration fee.
§ As long as there is an unpaid balance for the part of the program on which the stu
working, he must make at least the minimum tuition payment of $275 at each fall and
registration (and for any summer session in which he registers for academic work).
If the total fee is paid for the part of the program on which the student is working,
continue to register, without additional fee, for courses approved by his Master in Researc
the expiration of the time allowed for that part of his program.
Students in the College of General Studies are charged the University Center Fee onl
registered for courses on campus.

nal Course Fees

ain courses additional fees, such as laboratory and material fees, are charged cated in the course descriptions. These fees are charged by the semester and, otherwise indicated, may be defrayed in two payments when the tuition is paid manner. Breakage of apparatus is charged against the individual student. breakage is in excess of the normal amount provided for in the laboratory fee, ividual student will be required to pay such additional charges as are deter- by the department concerned.

tion Fees

te in Arts	$10.00
or's, Master's Education Specialist, Doctor's degrees	25.00
aster's Graduate Certificate in Health Care Administration	25.00
r Binding Master's Thesis	10.00
or Microfilm Service and Printing Announcement of Final Examination (Doctoral candidates)	60.00

nce Hall Fees (see page 58)

l Fees

ation fee (degree candidate), nonrefundable	25.00
n deposit, nonrefundable, charged each entering or readmitted full- undergraduate student	100.00
ation for room reservation, nonrefundable, charged each resident ent	100.00
sion tests (when required)	6.00–12.00
al Teacher Examination fee, for Bachelor of Arts in Education de- candidates	9.00–13.00
egistration fee, for failure to register within the designated period	15.00
ayment fee, for failure to make payments when due (see "Payment Fees," pages 32-33)	15.00
cial reinstatement fee, for reinstatement after financial encumbrance nonpayment of fees (see "Payment of Fees," pages 32–33)	35.00
ed check fee, charged a student whose check is improperly drafted, mplete, or returned by the bank for insufficient funds	15.00
uous Registration fee, to maintain "continuous registration" status ing any semester of absence from the University or after completion uition requirements*—due and payable on the official days of regis- ion	80.00
pecial physical examination	2.00
l Columbian College of Arts and Sciences departmental examination each course to qualify for receiving credit (advanced standing), ver of requirement, *or both*	25.00
ach examination to qualify for advanced standing and for each spe- examination	5.00
h test for foreign students (when required)	5.00
atory checkout fee, for failure to check out of Chemistry laboratory the date deadline set by the instructor†	3.00
cript fee, for each transcript of record	2.00

ent of the continuous registration fee entitles the student who is granted leave of absence rn and continue his work toward a degree under the academic requirements which were in t the time of his first registration. The continuous registration fee applies toward neither fee nor residence requirements for the degree.

fee does not apply to students granted military leave, see page 49.

udent who drops a Chemistry course before the end of the semester must check out of the ory at the next laboratory period.

Registration for on-campus courses in the University entitles each
the following University privileges: (1) the services of the Stude
Services Office; (2) the use of the University Library; (3) gymnas
leges; (4) admission to all athletic contests, unless otherwise specified
scription to the *University Hatchet*, the student newspaper; (6) adr
University debates; (7) medical attention as described under Stude
Service. These privileges terminate when the student withdraws or is
from the University.

PROJECTED TUITION INCREASES 1973–76

In order that students and their parents may plan more realistically fo
four-year period, tuition increases for the academic years 1973-74,
and 1975-76 have been estimated as follows:

Increase by year (full-time undergraduate students):

1973–74 .....
1974–75 .....
1975–76 .....

Increase by semester hour (graduate and part-time undergraduate students):

1973–74 .....
1974–75 .....
1975–76 .....

Every effort will be made to keep tuition increases within the abov
However, it is not possible to project future economic data with certai
circumstances may require an adjustment in these estimates.

PAYMENT OF FEES

No student is permitted to complete registration or attend classes u
charges are paid. Tuition and fees for each semester are due and pay
full at the Office of the Cashier at the time of each registration. Che
postal money orders should be made payable to George Washington Uni
The Student Accounts Office has responsibility for billing and main
student accounts for tuition, various fees, and room and board charges.
dent registered for 6 semester hours or more may sign a deferred p
contract with the Student Accounts Office at the time of each registrati
mitting him to pay one-half of the total tuition and fees (except for fe
able in advance) at the time of registration and the remaining half on
fore November 1, 1972 (for the fall semester), and March 7, 1973 (f
spring semester). Interest at the rate of 8 per cent per annum on the
balance will be charged from the date of registration to the date paym
made. The University will not obligate itself to notify the student, in ad
of the payment-due date for the second half of the semester charges.
Students receiving tuition assistance in the form of scholarships, g
ment tuition contracts, or other forms of tuition awards are not permit
sign deferred payment contracts unless the total tuition and fee charges

of the tuition awards by $500 or more. Under such circumstances
nt may be permitted to pay one-half of the amount due from the
t the time of registration and to defer the balance by signing a de-
yment contract.
ts who fail to make any payment when due will be automatically
a $15 late payment fee. Accounts which become 30 days past due will
cially encumbered and will be subject to the interest charge of 8 per
annum. In the event a student's account is financially encumbered, the
forfeits his rights to the use of deferred payment contracts in future se-
and the Student Accounts Office will notify the Registrar to withhold
future registration privileges, transcripts, diplomas, and other academic
ion until the account is settled financially. Financial settlement will re-
yment in full of all amounts due the University in addition to a finan-
statement fee of $35.
nts auditing courses are subject to all fees charged to students registered
it.

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many parents may wish some option in meeting and financing all or
the cost of a college education, the University offers educational loan
rough the Girard Bank in Philadelphia, Pa.; Funds for Education, Inc.,
ster, N.H.; and The Riggs National Bank, Washington, D.C.
ugh similar in purpose, these plans vary somewhat in coverage and
ns. One-year and multiple-year plans are available. Insurance covering
and health of the sponsor is provided through these plans.
iduals over twenty-one years of age who are employed full-time are
gible to apply. They may sponsor their own contracts, provided they
e conditions specified by the plan for which they are applying.
ures and applications describing these plans are available in the Office
nt Financial Aid.

WITHDRAWALS AND REFUNDS

ions for withdrawal from the University or for change in class sched-
t be made in person or in writing to the dean of the college, school,
ion in which the student is registered. Notification to an instructor is
cceptable notice (see "Withdrawal," page 48).
nds are granted only during the fall and spring semesters; no refunds
ted during the summer sessions. In authorized withdrawals and changes
ule, cancellations of semester tuition charges and fees will be made in
nce with the following schedule:

plete withdrawal from the University:

SEMESTER

Withdrawal dated on or before September 15, 1972	90 per cent
Withdrawal dated September 18 to September 29, 1972	75 per cent
Withdrawal dated October 2 to October 13, 1972	50 per cent
Withdrawal dated after October 13, 1972	none

SPRING SEMESTER

Withdrawal dated on or before January 19, 1973	90
Withdrawal dated January 22 to February 2, 1973	75
Withdrawal dated February 5 to February 16, 1973	50
Withdrawal dated after February 16, 1973	

2. For a *change in status from full-time to part-time student* or fo *withdrawal by a part-time student*, the above schedule applies to th ence in charges between the original program and the adjusted continuing in effect.
3. A student enrolled in a full-time program who drops or adds a co continues to be in a full-time program will have no financial adj of tuition made other than those involving course fees.
4. A student who is granted military leave before completing the seme receive credits for current charges in accordance with the schedule plete withdrawal from the University (see No. 1 above). Paymen in excess of the nonrefundable balance will be refunded to the The nonrefundable balance will be maintained as a deferred credit by the student when he returns to the University (see "Military page 49).
5. Regulations governing student withdrawals as they relate to reside and food service charges are contained in the specific lease arrang

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In no case will tuition be reduced or refunded because of absence from

Payment applies only to the semester for which a registration char curred and will not be credited to another semester (exception: students military leave, see page 49).

Authorization to withdraw and certification for work done will not a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they c banking arrangements in the community.

Financial Aid

FOR UNDERGRADUATE STUDENTS*

GEORGE WASHINGTON UNIVERSITY has, for undergraduate students, a pro financial assistance consisting of scholarships, loans, grants, part-time ment, or any combination of these resources. The University participate National Defense Student Loan, Educational Opportunity Grant, and Work-Study programs. Financial aid is awarded on the basis of the s scholastic record, financial need, and qualities of leadership and charac

Scholarships are awarded for the academic year.

Applications and supporting credentials for financial aid must be January 31 (entering freshmen), February 28 (enrolled undergraduate tering transfer students) preceding the academic year of the award for

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* For information concerning financial aid for students from foreign countries, see page 40.

by October 31, for the spring semester; and April 30, for the summer
. student must reapply for financial aid each year.
ergraduate transfer student is not eligible for scholarship funds until
nic year following completion of one full semester (15 hours) at this
with a minimum average of *B*. A transfer student is, however, im-
eligible for other types of financial aid.
e information concerning financial assistance is contained in the
"Student Financial Aid," which is available at the Office of Student
Aid, George Washington University, Washington, D.C. 20006.
owing scholarships are available to students in Columbian College of
Sciences, the School of Education, the School of Government and
Administration, and the School of Public and International Affairs.
ersity also offers many other scholarships which are available to stu-
ese colleges and schools.
orge Washington University Board of Trustees Scholarships.—Full-
l-tuition scholarships, which will begin in the fall semester and extend
successive academic years, provided the holder maintains a *B*
s well as a high standard of deportment, and continues to be in
eed. Candidates must plan to select a curriculum leading to a Bache-
e in any school of the University, except the College of General Stud-
nts who have demonstrated outstanding ability in interscholastic
d debate activities are eligible for the George F. Henigan Scholarships
which are included among these scholarships.

SHIPS

ent Rewards for College Scientists (ARCS) Foundation, Inc.,
ship
Page Allen Memorial Scholarship Fund (1966)
cholarships
Institute of Real Estate Appraisers Scholarship
Society of Women Accountants—District of Columbia Chapter—
ship in Accounting (1953)
nderson Scholarship (1969)
drews Scholarship (1920)
Brawner, Jr., Foundation Scholarship Fund (1963)
Carr Scholarships (1932)
Carter Scholarship (1871)
sassa Memorial Foundation Scholarship (1968)
a Alumnae Scholarship (1966)
n Women Scholarship Funds
Briggs Scholarship Fund (1959)
th V. Brown Scholarship Fund (1925)
Ross Chamberlin Scholarship Fund (1932)
Women's Scholarship Fund (1926)
ian Women Members' Scholarship Fund (1961)
Hughes Dufour Scholarship Fund (1961)
tson W. Eldridge, Jr., and John F. Eldridge Scholarship Fund (1964)

Sessions student is eligible for consideration only if he is enrolled in this University for
mester hours in the immediately preceding spring semester or has applied for financial
ollowing fall semester.

Founders of Columbian Women Scholarship Fund (1920)
Rose Lees Hardy Foundation Scholarship Fund (1957)
Lillian Young Herron Scholarship Fund (1925)
Nellie Maynard Knapp Scholarship Fund (1915)
Marcia B. Kraft Scholarship Fund (1966)
Janet McWilliams Scholarship Fund (1954)
Marie-Louise Ralph Turner Scholarship Fund (1963)
Daughters of the American Revolution Scholarship (1952)
Isaac Davis Scholarship (1869)
District of Columbia Institute of Certified Public Accountants Scho
Accounting (1964)
Estella Constance Drane Scholarship (1957)
Robert Farnham Scholarship (1871)
Federal Government Accountants Association—Washington, D.C., C
Scholarship in Accounting
Esther Brigham Fisher Scholarship (1951)
Foreign Student Scholarships (see page 40)
Friendship Business and Professional Women's Club Scholarship (1
General Motors College Scholarship (1955)
Georgetown Business and Professional Woman's Club Scholarship (1
Mildred Green Memorial Scholarship Fund (1959)
Anna Spicker Hampel Scholarship (1949)
Julian O. Hargrove Scholarship (1968)
Elma Lewis Harvey Scholarship (1921)
Hazleton Scholarship (1950)
George F. Henigan Scholarships in Debate (1967)
David B. and James L. Karrick, Jr., Scholarship Fund (1968)
Samuel and Elizabeth Kay Scholarships (1969)
Amos Kendall Scholarship (1869)
L. Poe Leggette Memorial Scholarship Established by WRGW (1968)
Mitchell-Stancioff Scholarship (1967)
A. Morehouse Scholarship (1861)
E. K. Morris Education Fund Scholarships (1972)
Helen Marie and Thomas E. Orr Scholarships (1965)
Phi Delta Gamma Scholarship (1956)
Fred B. and Alma D. Pletcher Scholarship Fund (1968)
Levin M. Powell Scholarships (1886)
Research Assistantships in Operations Research and Related Fields (see
37-38)
Resident Assistantships (see page 38)
Henry Whitefield Samson Scholarship Fund (1966)
Lula M. Shepard Scholarships (1946)
Sigma Delta Chi Foundation of Washington, D.C., Scholarships
Margaret Lucille Snoddy Scholarship (1970)
David Spencer Scholarship (1918)
Mary Lowell Stone Scholarship (1893)
Charles Clinton Swisher Scholarships (1941)
Tau Kappa Epsilon Scholarship (1959)
U.S. Office of Education Traineeships (1964)
University Hospital Scholarships in Medical Technology
University Players Scholarship in Memory of L. Poe Leggette (1968)

rsity Women's Club., Inc., Memorial Fund Scholarship (1967)
m Walker Scholarship (1824)
il Ann Brown and Henry Kirk White Scholarship Fund (1963)
Withington Scholarship (1830)
n's Physical Education Alumnae Association Scholarship (1964)
m G. Woodford Scholarship (1969)
Woodhull Scholarship (1919)
Club Scholarship (1950)

TS

following funds have been established to meet the special needs of disad-ged students from the District of Columbia Inner-City and the Washington politan area.

ational Opportunity Grants
ge Washington University's Educational Opportunity Program Tuition ants (1968)
Club of Walt Whitman High School, Bethesda, Md., Grant (1968)
iott Foundation Grant (1968)

FOR GRADUATE STUDENTS*

George Washington University program of financial assistance for graduate nts includes assistantships, fellowships, traineeships, graduate scholarships, rch appointments, part-time employment, and loans. Application for ad-ion to graduate study is a prerequisite for consideration. The University icipates in the National Defense Student Loan and College Work-Study rams.

pplication and correspondence concerning assistantships, fellowships, train-ips, or graduate scholarships should be sent directly to the dean of the ol concerned, and addressed to George Washington University, Washing-D.C. 20006. Unless otherwise specified, application and supporting creden-should be submitted no later than February 1 preceding the academic year which the award is made.

separate application for National Defense Student Loans or the College k-Study Program must be submitted to the Office of Student Financial Aid. lications for National Defense Student Loans must be submitted by April 1 he following academic year.

ISTANTSHIPS

esearch Assistantships in Operations Research and Related Fields.—Avail-to graduate students, juniors, and seniors, in any college or school of the versity. Research Assistants are expected to work 20 hours a week con-ting research in support of an established research program, in program-g or in conducting individual research on an approved research project. ends vary from approximately $3,300 to $6,800, depending on the status he student and the tenure of the appointment (9-12 months). Applications t be received prior to March 1. Further information and applications are

* information concerning financial aid for students from foreign countries, see page 40.

available from the Director, Institute for Management Science and
ing, School of Engineering and Applied Science, George Washingt
sity, Washington, D.C. 20006.

Resident Assistantships (men and women).—Available to gradua
and seniors in any field of study who are interested in working with
personnel program in University residence halls. Specific duties var
position, but basically consist of counseling, advising student group
ministration. Remuneration includes full tuition and a furnished roo
academic year. All positions are part-time, enabling staff members t
full-time students. Application should be completed before March
information may be obtained from the Office of the Dean of Studen

*Arlington County—George Washington University Cooperative As
Program*

Health Care Administration Research Assistantships

National League of Cities/George Washington University Assistantship

Urban Affairs Assistantship

FELLOWSHIPS, INTERNSHIPS, TRAINEESHIPS, SPECIAL PROGRA

The following fellowships, internships, and traineeships are available to
in the Graduate School of Arts and Sciences, the School of Educa
School of Government and Business Administration, and the School
and International Affairs. The University also offers many other fe
which are available to students in these colleges and schools. Comple
mation is contained in the pamphlet "Student Financial Aid," which
able at the Office of Student Financial Aid, George Washington U
Washington, D.C. 20006.

Graduate Teaching Fellowships.—Available to graduate students in
and doctoral programs in most departments of the University. Each
fellow renders a designated unit of service to his major department of
tion and receives a stipend of up to $2,800 (on a 9-month basis), plus
and course fees.

Research Traineeships.—Available under numerous sponsored progra
number of departments. Currently, the basic medical science departme
the departments of Psychology and Speech and Drama offer such pr
Stipends vary; information is available from the departments and the O
the Dean of the Graduate School of Arts and Sciences.

*Achievement Rewards for College Scientists (ARCS) Foundation, Inc.,
ship*

Robert A. Aleshire Fellowship Fund (1971)

American Association of Collegiate Schools of Business Fellowship

American Civilization Fellowships

*American Civilization Internships (Smithsonian Institution-George Was
University Cooperative Program)*

American Iron and Steel Institute Fellowship

Arthur Anderson & Co. Doctoral Fellowship

Winfield Scott Blaney Fellowship in International Affairs (1961)

Thomas Alva Edison Fellowship

Elementary Teacher Education Internships

Ernst & Ernst Grant to Doctoral Candidates in Business or Economi

Foreign Student Fellowships (see page 40)

Care Administration Fellowships
D. Irwin Doctoral Fellowships
Osborn King Research Fellowships (1927)
D. Lasker Fellowships in Housing, City Planning, or Urban Renewal
Foundation Fellowships
ies in Planning and Related Professions Program
l Association of Purchasing Management Fellowship
l Defense Education Act Fellowships
al Endowment for the Humanities Fellowships
al Historical Publications Commission-George Washington University
perative Research Fellowships
al Science Foundation Graduate Fellowships
al Science Foundation Graduate Traineeships
ces for the Future, Inc., Fellowship
ibliography Internships
s Bradford Sanders Fellowships (1928)
h Rite Fellowships
ffice of Education Fellowships (1964)
ublic Health Service Traineeships
Public Health Service Traineeships in Comprehensive Health Planning
Studies Fellowships of the Department of Housing and Urban Develop-
t
Transportation Center Fellowship

UATE SCHOLARSHIPS

e K. Carr Scholarships (1932)
H. and Margaret M. DeMaine Scholarships (1967)
ct of Columbia Institute of Certified Public Accountants Scholarship in
counting (1964)
ma Phi Beta Sorority Scholarships (1962)
r G. McGaw Scholarship in Health Care Administration (1971)
hell-Stancioff Scholarship (1967)
Pearson Scholarship Fund (1940)
Delta Gamma Scholarship Fund (1968)
hees Scholarships
ott Foundation Scholarships

NSORED AWARDS FOR GRADUATE STUDY

eral information regarding awards sponsored by foundations, professional learned societies, industries, and others which may be used in support of uate study is available at the Graduate Fellowship Information Center for nts enrolled at George Washington University. Information is available he prestige programs such as the Rhodes, Marshall, Woodrow Wilson, Ful- t, Rotary International, and Danforth, as well as many others.
s deadlines for application vary, qualified students should make inquiries in advance of the year of planned graduate study.

LOAN FUNDS

following loan funds are available to undergraduate and/or graduate stu-

dents in Columbian College of Arts and Sciences, the Graduate Sch
and Sciences, the School of Education, the School of Government a
Administration, and the School of Public and International Affairs
information is contained in the pamphlet "Student Financial Aid
available in the Office of Student Financial Aid, George Washington
Washington, D.C. 20006.

American Medical Association Nursing Home Administration
Foreign Student Loan Fund (1967)
W. K. Kellogg Foundation Hospital Administration Loan Fund
Jessie B. Martin Loan Fund (1967)
National Defense Education Act Student Loan Program
State Guaranteed Loan Program
Ellis H. Stearman Emergency Loan Fund
U. S. Loan Program for Cuban Students
United Student Aid Fund Loan
University Student Emergency Loan Fund

STUDENT EMPLOYMENT

The Student and Alumni Career Services Office maintains a registry
full-time and part-time positions available in the Washington area f
graduate and graduate students.

After registration, students may apply at the Student and Alumn
Services Office, Woodhull House, 2033 G Street, N.W., for interview
ferrals to positions for which they are qualified.

FOREIGN STUDENTS

Undergraduate foreign students with proven financial need who have co
one semester of full-time work (15 hours) at this University with a *B*
are eligible for consideration for the Board of Trustees Scholarships.
ships are awarded in the spring for the following academic year. See
tions for applying for undergraduate financial aid, pages 34-35.

Limited awards for graduate teaching fellowships are the responsibili
chairman of the department or dean of the school in which the degree
earned. Work as a teaching fellow requires excellent knowledge of E
both spoken and written.

Long-term loan funds for undergraduate and graduate foreign stud
limited in amount and are available only to those foreign-born persons w
established resident status in the United States through the Immigrat
Naturalization Service.

We suggest that students who wish to study in the United States ha
able sufficient funds to cover expenses for one full year before attemp
enter a college or university. The cost at this University for one academ
(September-May) is approximately $5,000. This estimate includes ro
board, tuition, books, clothes, and incidental expenses; no travel, hol
medical expenses are included.

LAW ENFORCEMENT EDUCATION PROGRAM

ogram of grants and loans, authorized under the provisions of the Omni-
ime Control and Safe Streets Act of 1968, is intended to help pay the
educational expenses of officers who are employed by publicly funded
forcement or correctional agencies. Studies may be full- or part-time in
range of subject areas and degree goals. Priority will be given to officers
state and local levels, and to veterans of the Armed Forces of the United
Applications and further information are available in the Office of Stu-
nancial Aid.

Prizes

ha Chi Sigma Prizes.—A handbook of chemistry awarded annually by
Pi Chapter to each of three students who carry at least 18 semester
during the freshman year and attain the highest averages in freshman
try.

name and year of graduation of the student who has attained the high-
ademic record in courses in chemistry is inscribed on a bronze plaque.
inner must have had at least 16 hours in chemistry including the final
er at this University.

ha Delta Pi Prize.—Offered annually to the woman in the junior class
he most outstanding record in scholarship, extracurricular activities, and
to the University.

ha Kappa Psi Prize.—A key, awarded annually by Beta Mu Chapter to
ale student who has completed 90 semester hours at this University and
ed the highest average grade in business administration, economics, inter-
al business, public accounting, and public finance. The name of the win-
nd the year of the award are engraved on a plaque in the Office of the
of the School of Government and Business Administration.

erican Institute of Chemists Prize.—A medal awarded annually to the
ating student majoring in chemistry who excels in scholarship, integrity,
adership.

e Walter G. Bryte, Jr., Achievement Award.—Provided by Walter G.
, Jr., Colonel, U.S. Air Force (retired), first Professor of Air Science at
ge Washington University. The award is presented annually primarily to
ndergraduate residence hall, secondarily to any other activity at the Uni-
y, which has shown, under the leadership of its elected or designated head,
ost improvement or excellence in its support of the principles and aims
e United States of America and George Washington University. The hall
her activity will be awarded a cash prize, and the name of its leader and
ll or activity will be engraved on a silver trophy.

rne Thurtell Burns Memorial Prize.—Awarded to the senior majoring in
istry who shows the greatest proficiency in organic chemistry, as evidenced
comprehensive examination, and who possesses such qualifications of
character, and personality as to give promise of future achievement.

siness Administration Prize.—Awarded annually by the Department of
ess Administration to the outstanding graduating senior in the accounting,

business administration, or international business degree prog
of scholarship, leadership, and service to the University.

Wilbur J. Carr Prize.—Established in 1962 by Edith K. Ca
tee of the University, in memory of her distinguished husband
uated from the School of Comparative Jurisprudence and Dip
It is awarded annually to that man in the graduating class o
who has demonstrated outstanding ability in his study of inte
and who has given evidence of possessing in marked degree the
produce the good citizen and the dedicated public servant.

The Chemical Rubber Co. Freshman Chemistry Achieve
Handbook of Chemistry and Physics awarded annually to the fi
who has demonstrated the greatest achievement in Chemistry

The Columbian Women Prize.—Awarded to the senior won
undergraduate life has most nearly fulfilled the objectives of Colu

John Henry Cowles Prizes.—Two prizes, established by Jo
Grand Commander of the Supreme Council of Thirty-third D
Council of the World) of the Ancient and Accepted Scottish
masonry, Southern Jurisdiction of the United States of Ame
annually to the senior in the School of Government and Busine
tion and to the senior in the School of Public and Internationa
the highest academic averages.

DeWitt Clinton Croissant Prize.—Awarded annually to the
student enrolled in a course in drama or active in University d
submits to the English Department the best essay on drama or the t

E. K. Cutter Prize.—Established by Marion Kendall Cutter "
in the study of English." Awarded to the member of the graduatin
record in English, combined with general excellence, shows most
tude for and attainment in English studies.

Isaac Davis Prizes.—Established in 1847 and awarded annually
seniors who have made the greatest progress in public speaking w
in the University. Awards are to be determined by a public-spea
in which the participants deliver original orations. Only members
class of Columbian College of Arts and Sciences who are candid
degree of Bachelor of Arts or Bachelor of Science are eligible to co

Delta Gamma Prize.—Awarded annually by Beta Rho Chapter to
who, at the end of her freshman year, has the most outstandin
scholarship, extracurricular activities, and service to the University.

Henry Gratton Doyle Memorial Prize.—Established in memory
Gratton Doyle, a former Dean of Columbian College. Awarded
an outstanding senior for excellence in Spanish.

Elton Prize.—Established by the Reverend Romeo Elton, of Ex
land, and awarded annually to the student with the highest average i
advanced course in the Greek language and literature.

Jesse Frederick Essary Prize in Journalism.—Established by Hel
Murphy and awarded annually to a student who has given promise
citizenship and who submits the best printed and published evidence
in "forthright reporting" and good journalistic writing, in a student p
or elsewhere.

Joshua Evans III Prize in Political and Social Sciences.—A memo
"established by friends because of an outstanding life." Awarded an
that man in the graduating class "who has demonstrated his signal

al and political sciences and who has given promise of the interpreta-
hat ability in good citizenship among his fellows."

E. Fitch Prize.—Established by James E. Fitch in memory of his son.
d annually to a senior student for the best examination in chemistry.

Douglas Goddard Prize.—A memorial established by Frederick Joseph
d, of Georgetown, D.C. Awarded annually to the junior or senior stu-
king the highest average in American literature.

rd Carrington Goddard Prize.—Established by Mary Williamson God-
lice Douglas Goddard, and Frederick Joseph Goddard, of Georgetown,
memory of Edward Carrington Goddard, class of 1881. Awarded to
or or senior student making the highest average in the French language
rature.

an Richardson Goddard Prize.—A memorial established by Mary Wil-
Goddard, Alice Douglas Goddard, and Frederick Joseph Goddard, of
town, D.C. Awarded to the junior or senior student making the highest
in the following fields: business administration, economics, interna-
usiness, or public accounting.

iner G. Hubbard Memorial Prize in United States History.—Established
trude M. Hubbard in memory of her husband and awarded annually to
ember of the graduating class majoring in history who has maintained
hest standing in courses in United States history.

rnational Business Prize.—Two prizes awarded annually by the School
vernment and Business Administration to students in the international
ss degree program, one awarded to a graduating senior and one awarded
raduate student.

pa Kappa Gamma Prize.—Awarded annually to a full-time freshman or
more student for excellence in Biological Sciences 12.

id Lloyd Kreeger Prizes in Art.—Five prizes given by Mr. Kreeger, three
fine arts and two in art history and theory (including museology). Fine
izes are awarded to a senior or graduate student in painting, sculpture,
raphics or design. One prize in art history and theory is awarded to a
and one to a graduate student. Candidates for the prizes must submit
al papers or works of art. Winners are selected by distinguished repre-
ives of the field of art in the Washington, D.C., area.

nna Mirin Kullback Memorial Prize.—Established in 1968 by Solomon
ack in memory of his wife. Awarded annually by a committee of faculty
ers of the Department of Statistics to a full-time undergraduate or grad-
tudent majoring in statistics, who will have completed 18 semester hours
istics courses by the end of the spring semester.

ig Sterling Logan Memorial Prize.—Established by Washington City Rho
er of Sigma Alpha Epsilon. A plaque awarded annually to an outstand-
reshman man of high academic achievement who has participated in
curricular activities for the betterment of the University.

rtar Board Prize.—A silver cup awarded annually to the woman student
e sophomore class having an average of *B* or higher and the most out-
ing record in activities.

vian Nellis Memorial Prize.—Awarded to a student in the English Depart-
who has shown special promise in the field of creative writing.

d Men Prize.—A plaque awarded annually to the man in the junior class
has made outstanding contributions to student activities.

Omicron Delta Kappa Prize.—A plaque awarded annually by Alp Circle to "that member of the senior class who throughout his course the most constructive work in the furtherance and upbuilding of the U student activities."

Order of Scarlet Prize.—Awarded annually to that member of the so class who has the most outstanding record in extracurricular activ service to the University.

Panhellenic Association of Washington, D.C., Prize.—A trophy to be to the Panhellenic Sorority maintaining the highest yearly scholastic a the University for the previous year.

Phi Delta Kappa Prize.—Awarded annually by Beta Gamma Chapt outstanding senior man in the teacher education program in the School cation.

Phi Eta Sigma Prize.—A choice book selected from the field of th ent's major, awarded annually by the George Washington University to the male student attaining the highest scholastic average in his semester of work. The winner's name is engraved on a plaque in the the Dean of Columbian College of Arts and Sciences.

Pi Beta Phi Prize.—Awarded annually to the woman member of th class who throughout her college course has done the most constructive the promotion of student activities among the women of the University.

Pi Lambda Theta Prize.—Awarded annually by Alpha Theta Chapte outstanding senior woman in the teacher education program in the Sc Education.

Psi Chi Prizes.—Two prizes awarded annually by the George Was University Chapter to the best undergraduate student in experimental p ogy and to the M.A. degree candidate submitting the best thesis in psyc

Ruggles Prize.—Established by Professor William Ruggles in 1859, annually to a candidate for a Bachelor's degree for excellence in math

Hermann and Johanna Richter Schoenfeld Prize.—Established in appreciation of the inspired teaching and devotion to his students of D mann Schoenfeld, who for more than 20 years until his death in 1926 the Department of German. Hermann Schoenfeld, Ph.D., LL.D., was recognized as a scholar of distinction whose presence on the faculty prestige to the University. This prize is given annually to a member graduating class for excellence in historical and cultural phases of studies.

Smith Kline & French Prize.—Awarded annually to the student wh mits the best undergraduate research project in psychology.

Society of Colonial Wars in the District of Columbia Prize.—A gold awarded to a candidate for a graduate degree who, in the judgment of th ulty of the Department of History, submits a thesis or dissertation dem ing excellence in historical research in American Colonial history. The U sity reserves the right to withhold the award if no thesis or dissertation ing the required degree of excellence is submitted.

Staughton Prize.—Established by the Reverend Romeo Elton and a annually to the student making the best record in the most advanced co the Latin language and literature.

James MacBride Sterrett, Jr., Prize.—Established in 1911 by Professo rett in memory of his son. Awarded annually to the student who obta highest average in Physics 1 and 2.

es Clinton Swisher Historical Club Prize.—Established in 1936 by the Clinton Swisher Historical Club and augmented in 1941 by the bequest essor Swisher. Awarded annually to the student who submits the best vering some phase of medieval history.

min D. Van Evera Memorial Prize.—Awarded annually to that Graduching Fellow in Chemistry selected as the most effective teacher during ent academic year.

Wall Street Journal Leadership Prize.—Awarded annually to a graduatior in the Bachelor of Business Administration degree program for ding leadership and service to the University.

nas F. Walsh Prize.—Established in 1901 and awarded annually to the who submits the best essay in Irish history.

ander Wilbourne Weddell Prize.—Established in 1923 by Virginia Chase l in memory of her husband. Awarded annually to a candidate for a who writes the best essay on the subject of "the promotion of peace the nations of the world." The prize essays shall become the property University and shall not be printed or published without the written of the University. The University reserves the right to withhold the if no essay attaining the required degree of excellence is submitted.

Regulations

ENT ENROLLED in the University is required to conform to the followgulations and to comply with the rules and regulations of the college, or division in which he is registered.

udent who withdraws or is suspended, or is otherwise absent from the sity for one semester or more, may re-enter and continue his work only the rules and regulations in force at the time of his return.

student knowingly makes a false statement or conceals material infor- on an application for admission, registration card, or any other Univerocument, his registration may be cancelled. If such falsification is dis- d after the student has established an academic record at the University, y be subject to dismissal from the University. Such a student will be ble (except by special action of the Faculty) for subsequent registration University.

NDANCE

dent may not attend classes until registration is completed and fees due id. He may attend only those classes for which he is registered. Regutendance is expected. A student may be dropped from any course for absence.

LARSHIP REQUIREMENTS

dent who fails to maintain the scholarship requirements of the college, l, or division in which he is registered may be dismissed from the Uni-y.

GRADES

Grades are mailed to the student through the Office of the Reg
close of each semester. They are not given out by instructors.

UNDERGRADUATE

The following grading system is used: *A*, Excellent; *B*, Good; *C*, A
Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal; *CR*, Cred
Credit. Except for courses which specifically state that repetition f
permitted, a student may not repeat for credit a course in which he h
a grade of *D* or better, unless required to do so by the department
A written statement to this effect must be submitted to the Regist
appropriate department chairman.

GRADUATE

The following grading sysem is used: *A*, Excellent; *B*, Good; *C*,
Pass; *F*, Fail; *I*, Incomplete; *CR*, Credit; *W*, Authorized Withdraw
for courses which specifically state that repetition for credit is permitt
dent may not repeat for credit a course in which he has received a g
or above, unless required to do so by the department concerned. A wri
ment to this effect must be submitted to the Registrar by the appropria
mental chairman. In the Graduate School of Arts and Sciences this
is slightly different (see page 94).

INCOMPLETE/AUTHORIZED WITHDRAWAL

Whenever a grade has not been assigned, the symbol *I* (incomplete)
symbol *W* (authorized withdrawal) will be recorded. The symbol *I*
that a satisfactory explanation has been given the instructor for the
failure to complete the required work of the course. At the option o
structor, the grade of *I* may be recorded if a student, for reasons be
control, is unable to complete the work of the course, and if the inst
informed of, and approves, such reasons before the date when grades
reported. The grade may be used only if the student's prior performa
class attendance in the course have been satisfactory. Any failure to c
the work of a course which is not satisfactorily explained to the in
before the date when grades must be turned in will be graded *F*. If ac
reasons are later presented to the instructor, he may initiate an app
grade change. Although the grade of *I may* remain on the records for
mum of one year, the instructor should normally set a much briefe
within which the uncompleted work (usually the final examination o
quired paper) must be made up. The grade of *I* cannot be removed
registering for the course here, or by taking its equivalent elsewhere.
complete" cannot be made up after the lapse of one calendar year ex
written permission of the dean's council of the college, school, or divisi
cerned. An incomplete which is not removed within one calendar year
matically changed to an *F*.

ALITY-POINT INDEX*

ship is computed in terms of the quality-point index, obtained by divid- number of quality points by the number of semester hours for which dent has registered, both based on his record in this University. Quality are computed from grades as follows: *A*, four points; *B*, three points; points; *D*, one point; *F*, no points, for each semester hour for which dent has registered. Courses marked *W*, *I*, *NC*, or *CR* are not con- in determining the index, except that courses marked *I* will be con- when a formal grade is recorded. An incomplete which is not removed one calendar year is automatically changed to an *F*. Grades in courses t another institution are not considered in computing the quality-point

/NO CREDIT OPTION

or or senior student in the School of Education or the School of Gov- t and Business Administration who has a cumulative quality-point index 0 or better, may, with the approval of his adviser and dean, take one a semester and receive a grade of *CR*, credit, or *NC*, no credit, which recorded on the student's transcript but will not be reflected in his -point index. No student will be allowed to take more than 4 credit/no courses. A student must sign up for such an option at registration. no circumstances may a student change from credit/no credit status to status, or vice versa, after the end of registration. Courses required in udent's major field may not be taken on the credit/no credit basis. A er student may not choose this option until the second semester of his ment at this University.

EXAMINATIONS

examinations for undergraduate courses are scheduled at the end of each ter by the Office of the Registrar. Examinations for courses numbered r above are scheduled, if desired, by the individual department or instruc-

MIC DISHONESTY

mic dishonesty on the part of any student will result in a disciplinary of *F* for the course involved and also may, upon the recommendation appropriate dean's council, result in his suspension from the University stated period, at the end of which time he may petition for readmission. approval of the appropriate dean's council, the disciplinary grade of re—Academic Dishonesty" will be recorded for the course involved, and rade will be employed in the computation of the quality-point index or mic standing. A student so suspended shall be withdrawn from all other s except those in which all work has been completed.

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able only to the Graduate School of Arts and Sciences, the School of Education, the of Government and Business Administration, and the *graduate programs* in the School of nd International Affairs.

WITHDRAWAL

Withdrawal from a course or from the University requires the permis
the dean of the college, school, or division in which the student is reg
Permission to withdraw from the University will not be granted a stude
does not have a clear financial record (see pages 33-34).

Each college, school, and division of the University sets deadline d
each semester concerning withdrawal. Withdrawal between these dates
end of the semester is permitted only in exceptional circumstances.

All charges for courses dropped without the approval of the dean
met by the student. Reporting the dropping of a course to an instruct
not effect its discontinuance.

CHANGES IN PROGRAM OF STUDY

Changes within a College, School, or Division.—A student may not
tute one course for another, drop courses (see "Withdrawal," above),
his status from credit to audit or audit to credit without the approval
dean of the college, school, or division in which he is registered.

Change from one section to another of the same course may be mad
the approval of the dean and the department concerned.

Change from one major subject to another within the same college or
may be made with the approval of the dean. All requirements of the
of study to which the change is made must be met.

Transfer within the University.—Application for transfer to another
school, or division must be made to the appropriate admitting office on th
provided by the deans concerned. Transfer from the appropriate preprofe
curriculum in Columbian College to Bachelor's degree candidacy in the
of Education or the School of Public and International Affairs is autom
completion of 60 or more semester hours of course work.

A maximum of 45 semester hours earned in the Division of Universi
dents may be applied toward a Bachelor's degree in a degree-granting col
school of the University. Work done in the Division of University St
will not be counted toward a graduate degree unless prior written ap
obtained from the relevant degree-granting college or school, has been
the Office of the Dean of the Division of University Students (see page

Students transferring within the University are advised to study carefu
graduation requirements on pages 49-50 and to note that, unless oth
specified, in all undergraduate divisions, 30 semester hours, including a
12 semester hours in the major field, must be completed while registe
the school or college from which the degree is sought. Upon transf
student should consult the dean concerned and understand clearly the re
ments he must fulfill.

CREDIT

Credit is given only after registration for a course and satisfactory comp
of the required work, or upon the assignment of advanced standing in ac
ance with the regulations of the several colleges, schools, and divisions.

Auditing.—A person who has been admitted to the University m
registered, with the permission of the instructor, as an "auditor" in a
(no academic credit). An auditor is not required to take active part or t

ions. A student who takes a course as an auditor may not repeat it credit.

SCHOOL CREDIT

t who plans to attend summer school at another institution and apply earned toward graduation from this University must first secure the pproval of his dean. In no event will credit in excess of what might in a similar period in this University be recognized.

E SHEET

est, the Registrar will issue to undergraduate degree candidates a balet showing the amount of work completed and the requirements reto be met for the degree. A second balance sheet is issued only if the hanges major or degree objectives.

RIPTS OF RECORD

ranscripts of student records are issued on request of the student or tudent who has a clear financial record. A fee of two dollars is charged transcript.

UOUS REGISTRATION

candidates are expected to maintain continuous registration until *all* deuirements are satisfied. Students who have completed course registraluding the thesis) must maintain continuous registration by paying the ous registration" fee (see page 31). By failing to register for one or more, the student breaks his registration and must be readmitted admission," page 27). A "Readmitted Student" is required to satisfy iculum requirements existing at the time of his readmission.

nts must be registered during the summer if they are taking courses, g required examinations, are receiving guidance toward theses or diss, or are expecting to graduate at the end of the Summer Sessions.

RY LEAVE

nt called to active duty may be granted military leave for the period of uty, upon presentation to his dean of a copy of his orders and a petisuch leave. The maintenance of "continuous registration" is not ref the student on military leave; however, he must apply for readmishe University well in advance of the semester in which he expects to ayments for tuition and fees which are not refunded to the student at he is granted military leave will be maintained as a deferred credit for unt and use upon his return to the University.

ATION REQUIREMENTS

are conferred in February, May, and September.

recommended by the Faculty for graduation a student must have met ission requirements of the college or school in which he is registered;

completed satisfactorily the scholarship, curriculum, residence, and
quirements for the degree for which he is registered; and be free fro
debtedness to the University. Registration, either for course work o
"continuous registration" fee basis, is required for the semester or sum
sion immediately preceding the awarding of a degree.

Application for Graduation.—An "Application for Graduation" fo
be filed and the appropriate fee paid at the time of registration for th
mester or summer session of the senior or final year. Students compl
gree requirements during the Summer Sessions will be awarded diplo
formal convocation) September 30, *provided* they have completed al
requirements and have applied for graduation as a part of registration
Summer Sessions.

Scholarship.—The student must meet the scholarship requirements
particular degree for which he is registered.

Curriculum.—Minimum curriculum requirements for each degree ar
under the college or school offering work in preparation for the degree.

Residence.—Unless otherwise specified, in all undergraduate divisions
University, *a minimum of 30 semester hours, including at least 12 hour*
major field, must be completed while registered in the school or colleg
which the degree is sought. This requirement applies to students trans
within the University as well as to students transferring from other insti
Unless special permission is granted by the dean of the college or scho
cerned to pursue work elsewhere, the work of the senior or final year m
completed in the college or school from which the degree is sought.

The graduate student must meet the residence requirements for the p
lar degree for which he is registered.

National Teacher Examinations.—All candidates for the degree of Ba
of Arts in Education are required to take the National Teacher Examin

Attendance and Conduct.—The University reserves the right to refu
confer a degree upon a candidate whose attendance or conduct has bee
satisfactory.

Thesis or Dissertation.—A thesis or dissertation submitted in partial sa
tion of requirements for a degree must be presented in its final form t
dean of the college or school concerned no later than the date specified i
University Calendar.

Accepted theses and dissertations, with accompanying drawings, becom
property of the University and are deposited in the University Library, w
the duplicate copies are bound and made available for circulation. See
appropriate college or school in this catalogue for regulations governing t
and dissertations.

HONORS

WITH DISTINCTION

In all undergraduate divisions of the University the degree may be confe
"With Distinction," at the discretion of the Faculty, if a student meets the
cific requirements of his college or school, as follows:

1. Columbian College of Arts and Sciences or School of Public and
ternational Affairs—the attainment of the grades of *A* in 60 per cent of
courses taken at this institution; or
2. School of Education or School of Government and Business Admini

—the attainment of a quality-point index of 3.50 or higher on all course
k taken at this institution.
o be eligible, a student must have completed at this institution at least one-
of the courses required for the degree.

CIAL HONORS

cial Honors may be awarded by the Faculty to any member of the graduat-
class for outstanding achievement in the student's major field on recom-
ndation of the major department. The student must fulfill all of the follow-
requirements:
. He must have his candidacy for Special Honors approved by the faculty
mber representing the major department or field not later than the begin-
g of the senior year.
2. He must meet such other conditions as may be set at the time his can-
acy is approved.
3. He must have completed at this institution at least one-half of the courses
uired for the degree.
4. He must fulfill the specific requirement of the college or school in which
is registered, as follows: (a) Columbian College of Arts and Sciences or
School of Public and International Affairs—attainment of the grades of
or *B* in 50 per cent of the courses taken at this institution; or (b) the
hool of Education or the School of Government and Business Administra-
n—maintain a quality-point index of at least 3.00 on all course work taken
this institution.

PARTMENTAL HONORS

he departments of English and History offer Departmental Honors if students
eet specific requirements. For details, see the appropriate department.

HE LIBRARY

ll students registered in the University have the privilege of using the Uni-
rsity Library. Its stacks are open, and all students are welcome to browse at
eir leisure. The Student Identification Card, issued upon the payment of fees,
ust be presented when books are borrowed for outside use.
The loan period for most books available for outside circulation is 30 days.
fine of 25 cents is charged for each day a book is overdue. Any book which
rculates is subject to recall by the Library if needed for reserve or other use.
eserve books must be used in the reserve reading room when the Library is
pen, except that they may be withdrawn for overnight use beginning at 8:30
m. A fine of 50 cents is charged for each hour or fraction thereof that a
serve book is overdue. Grades of a student are withheld until his library
cord is clear.
All students using the University Library are expected to be familiar with its
tailed regulations, available on application to any of the Library's service
sks.

IGHT TO DISMISS STUDENTS

he right is reserved by the University to dismiss or exclude any student from

the University, or from any class or classes, whenever, in the interes
student or the University, the University Administration deems it a

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve t
to modify or change requirements, rules, and fees. Such regulations
into force whenever the proper authorities may determine.

RIGHT TO MAKE CHANGES IN PROGRAMS

The right is reserved by the University to make changes in programs
notice whenever circumstances warrant such changes.

UNIVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATI

In general, the policy of the University is one of attempting to keep t
dent's record confidential and out of the hands of those who would use
other than legitimate reasons. At the same time, the policy must be
enough not to hinder the student, the University, or the community i
legitimate endeavors.

No information concerning a student will be released except as noted b

1. Information such as whether or not the student is currently enrolled;
of attendance; verification of date and place of birth; degrees earned (if
date, major field or area of concentration, and honors received; home and
addresses and telephone numbers; school, college, or division of enrollmen
class; verification of signature; name and address of parent or guardian

2. The issuance of formal transcripts of record to recognized institutio
higher learning; the certification of academic achievement to the various r
nized professional associations (law, medicine, engineering, education, etc

Additional information will be released only on written authorization
the student, or by court order or subpoena. If a subpoena is served, the
dent whose record is being subpoenaed will be notified and the subpoena
be referred to the University's legal counsel.

Government investigative agencies have no inherent right to access to
dent files and records. If expressly requested, properly identified represe
tives from federal, state, or local government agencies may be given the i
mation listed under No. 1, above.

UNIVERSITY POLICY ON SELECTIVE SERVICE INFORMATION

The University notifies draft boards of a student's academic status only w
the student requests or authorizes, in writing, that the draft board be notifi
An undergraduate student desiring certification for the Selective Service Syst
must go to the Registrar's Office and complete the Selective Service Informati
Card which authorizes the University to notify his draft board of his full-t
enrollment. It is the student's obligation to complete this card if he wants
draft board to know that he is registered as a full-time student.
This card contains the following statement:

By my signature below, I hereby authorize the University, to notify my
draft board of my academic status in the University, or of any changes i
academic status that occur during this semester.

ational Law Center students and students in the School of Medicine should ck with the appropriate dean's office for details of the policy in their school.

OPERTY RESPONSIBILITY

University is not responsible for the loss of personal property. A "Lost Found" Office is maintained on campus in the Safety and Security Office.

CENTLY ESTABLISHED REGULATIONS

Appendix (pages 485–87) contains regulations recently approved by the iversity's Board of Trustees.

Cooperative Programs

NSORTIUM OF UNIVERSITIES OF THE WASHINGTON METROPOLITAN REA, INC.

E UNIVERSITIES in Washington, D.C.—American University, Catholic Uni- rsity of America, *George Washington University*, Georgetown University, d Howard University—are associated in a Consortium through which they ordinate the use of their respective facilities; Dunbarton College of Holy oss and Trinity College are associate members of the Consortium. Students approved programs leading to degrees in any one of these institutions have opportunity to select from the combined offerings of all the particular urses which best meet their needs.

Participation is limited to campus degree candidates. The following, how- ver, are excluded: students in Canon Law, Dentistry, Medicine, and Theology. aw students are also excluded from participation, except for candidates for he degree of Master of Laws at George Washington University and George- own University.

In special courses involving private instruction (such as music or art) or utorial study, if a special fee is charged, this fee is not covered by the Con- ortium agreement and must be paid by the individual student to the institution dministering the course. Courses offered in Reserve Officer Training Corps rograms are excluded.

Students are encouraged to study the announcements of programs of all the articipating institutions. See page 29 for information concerning registration or Consortium courses. *A student may not take courses at another institution hat are available at his own.*

Registration forms and instructions are available from the registrar of the nstitution in which the student is enrolled. The student registers and pays at his own institution for all Consortium courses.

AIR FORCE RESERVE OFFICERS' TRAINING CORPS (AFROTC)

The Department of Aerospace Studies at Catholic University of America, under provisions of an agreement between George Washington University and Cath- olic University, offers a two-year AFROTC program.

The successful completion of the program qualifies the student for commission in the United States Air Force upon graduation. Exce well-qualified students may receive a Regular Officer appointment. gram is designed to provide education that will develop skills and attitu to the career professional Air Force Officer. Emphasis is placed on of leadership and other attributes essential to progressive advancem positions of increasing responsibility as commissioned officers in the Ai

Full-time students who have two years remaining toward a baccalau graduate degree are eligible to enter the program. Each student mu physical and mental standards set by the Air Force. Candidates mu plete six weeks of Field Training, conducted by the Air Force at de bases, during the summer preceding enrollment in the program. A must have and maintain a quality-point index of 2.00 or its equivalent. cations must be made *early* in the academic year prior to the one of enr in the program, so that all qualification criteria may be met in time fo tion consideration in the spring.

The program is offered at Catholic University. At the time of enrollr registration fee must be paid. There is no tuition charge. Students in th gram receive a monthly retainer fee of $50. Uniforms and textbooks a nished without cost. Students participating in the Field Training phase ar at a rate established by the U.S. Government and are also furnished tr and from the Field Training base.

Interested students should consult the Department of Aerospace St Catholic University of America, Washington, D.C. 20017.

The Speech and Hearing Clinic

Director of Speech Pathology and Audiology, J. W. Hillis

THE SPEECH AND HEARING CLINIC offers diagnostic and remedial work for dren and adults with such communication difficulties as stuttering, lisping, palate speech, and cerebral-palsied speech; and with voice, articulatory, hearing problems. Diagnostic and remedial work is also available for pe with nonstandard language usage due to such conditions as hearing loss, damage, mental retardation, and environmental factors.

Fees.—The fee for an initial evaluation is $20. Fees for additional spe ized testing are dependent on the testing involved. The fees for indiv speech or hearing therapy range from $3 to $10 a session. Fees are red for full-time students enrolled in the University and for persons receiving g therapy. Fees are payable at the Office of the Cashier.

The Reading Center

Director, Mary Ellen Coleman

THE READING CENTER offers individual diagnostic and corrective services fo levels: primary, elementary, secondary, and adult. In addition, special rea

vement classes are conducted for high school and college students as
s other adults.
complete diagnosis includes psychological tests; vision, hearing, domi-
, and spelling tests; and various types of reading achievement and apti-
tests. Results are interpreted, and a written report is presented in confer-
with the parents or the individual.
e special reading improvement classes for high school students, college
nts, and other adults are offered throughout the year at stated intervals.
hasis is placed on improvement of vocabulary, speed, comprehension, and
skills. Instruction in spelling is also provided as needed. Mechanical aids
as the tachistoscope, rate accelerator, and controlled reader are available
ncreasing speed of comprehension.
es.—The fee for individual diagnosis is $75; for individual instruction, $8
son; for semi-individual instruction, $6 a lesson; for instruction in small
ps with common reading difficulties, $5 a lesson. Reading classes (15 two-
sessions) are offered for adults, $125; for full-time George Washington
versity students and faculty, $60. All fees are payable in advance at the
e of the Cashier.

Veterans Education

OFFICE OF THE REGISTRAR, Luther Rice Hall, 2121 Eye Street, N.W., as-
students entitled to educational benefits as veterans or war orphans with
problems which may arise concerning their benefits. This Office also proc-
s certification of enrollment and attendance to the Veterans Administration
hat monthly allowances will be paid.
When feasible, students entitled to benefits as veterans or war orphans should
sult the Office of the Registrar prior to submitting application to the Veter-
Administration. All such students should obtain the instruction sheet issued
the Office of the Registrar, which sets forth requirements to be fulfilled
ore certification of enrollment can be made to the Veterans Administration,
which includes other information of general interest.
The Veterans Administration is at 2033 M Street, N.W., Washington, D.C.
21.

University Computer Center

Director, R.E. Thomas

UNIVERSITY COMPUTER CENTER is located on the first floor of Stuart Hall,
3 G Street, N.W. The facilities of the Center are available for academic
poses to all registered students and to members of the instructional staff.
e Center has as its principal mission the provision of a powerful computing
tem which serves the University in its educational and research endeavors.
e Center's programming staff concentrates its efforts in conducting faculty
staff seminars, consulting with users in the preparation of complicated pro-
ms, and carrying out computer-oriented research.

The Computer Center equipment consists of an IBM system 360 computer (to be replaced by an IBM system 370 Model 145) w capacity on-line disk storage, a card read/punch, a high-speed line pr four tape drives. The principal languages available to the user are FO IV, COBOL, Programming Language One (PL/I), Assembler Langu ALGOL. In addition, numerous utility, statistical, data manipulation, a lation systems and special languages are available in the library of p Facilities are available on a first-come, first-served basis for prepa programs and data.

Computer programming courses are offered by the School of Gov and Business Administration, the Department of Statistics, and the S Engineering and Applied Science. In addition, many other departme courses that utilize the computer as a research adjunct to course worl

The Computer Center is normally open 24 hours a day.

Continuing Education for Women

THE OFFICE OF CONTINUING EDUCATION FOR WOMEN, 2029 K Street, assists women who wish to return to academic study. Brochures are av describing programs.

General Alumni Association

THE OBJECTIVES OF THIS ASSOCIATION are to unite the graduates who w associate themselves for charitable, educational, literary, and scientific poses, and to promote the general welfare of the University.

Eligible members are those who have matriculated in any school of the versity and who have left the University in good standing, or any perso is or has been a member of the teaching, research, or administrative staff University, or of the Board of Trustees of the University. Active member those who are life members of the George Washington University Ge Alumni Association or the Alumni Association of any school of the Unive or are current contributors to the George Washington University Fund.

The Alumni Office is in Bacon Hall, 2000 H Street, N.W., Washington, 20006.

All alumni are urged to keep the Alumni Office informed of changes of dress or occupation and to supply information with regard to their fe alumni.

STUDENT LIFE

Vice President for Student Affairs W.P. Smith, Jr.
Assistant to the Vice President for Student Affairs K.E. Bumgarner
Director of the Cloyd Heck Marvin Center B.C. Bell
Dean of Students Marianne Phelps

OFFICE OF THE VICE PRESIDENT FOR STUDENT AFFAIRS develops Student programs, policies, and procedures to complement the University's formal uction program. These activities are implemented through the offices of Cloyd Heck Marvin Center, Counseling Center, Dean of Students, Educa- al Opportunity Program, Housing, International Students, Student Activities, ent and Alumni Career Services, and Student Health Service.

STUDENT SERVICES

FICE OF THE DEAN OF STUDENTS

n of Students Marianne Phelps
istant Deans of Students Gary Hamer, Barbara Lembcke

Office of the Dean of Students provides general counseling and informa- services to individual students. In addition, the staff of this Office is re- nsible for counseling and other programs within the residence halls. The an of Students also works with the Adviser to International Students, the ector of the Counseling Center, the Director of the Educational Opportunity gram, and the Director of Housing in the implementation of their programs.

USING

ector of Housing Ann Webster
istant Directors of Housing Karen Klinghoffer, George Ridler

mplete information concerning the University's residence halls is available m the Director of Housing, George Washington University, Washington, C. 20006. Information concerning off-campus housing near the University y be obtained at this Office. The reservation of rooms in private houses st be made by students.

Admission to the University does not include a room reservation. The stu- t will receive, with his notification of acceptance, University residence hall ormation, an application for residence hall space, a medical examination m, and a declaration of intent to attend the University. The medical exami- ion form must be completed by the applicant and his physician and returned he Student Health Service Office. The application for residence hall space

must be accompanied by a $100 *nonrefundable deposit*. Early decision
must submit the deposit by December 15. The housing deposit is
toward the semester's room charge. Rooms are leased for the acaden
and lease payment must be made by July 15 for the fall semester.

1972–73 Residence Hall Rates per Person for Two Semesters*

For Men:
Adams Hall
double room
triple room
Calhoun Hall
double room
triple room

For Women:
Strong Hall
single room
double room

For Men and Women:
Crawford Hall—double room
Mitchell Hall—single room
Thurston Hall
double room, triple room, large room for four
suite for six

Graduate Men and Women Only:
Graduate Hall—apartment for three
Madison Hall—double room

FOOD SERVICE

Resident freshmen and sophomores are required to participate in t
service plan. Freshmen must participate in the seven-day, 20 meals p
plan, at the rate of $680* for the academic year. Sophomores may elec
the 20-meal plan or a five-day meal plan, 15 meals Monday through
for $640* for the academic year. Either plan is optional for junior, sen
graduate students. Food service payment does not cover University inte
or vacation periods. All meal cards admit bearer to the dining room in T
Hall and the second floor contract dining room in the Cloyd Heck
Center.

MUNSON HALL APARTMENTS

Munson Hall is a University-owned and operated apartment house co
15 one-bedroom and 54 efficiency apartments. Graduate and married s
are given priority for residency until July 15 each year. Seniors and
who have lived at least one year in University residence halls will be
ered for residency after that date if space is available. All leases are
12-month year.

* Residence hall and food service prices subject to change.

ATIONAL OPPORTUNITY PROGRAM

or W.T. Trent

Educational Opportunity Program is designed to offer a college education rily to black and other minority students who are graduates of District lumbia high schools and/or other qualified District residents. It provides portunity for a student to seek a degree in almost any field and at the time receive academic and/or financial assistance.

D HECK MARVIN CENTER

tor B.C. Bell
tant Director D.L. Cotter
cial Officer L.R. Moore
tions Manager W.J. Hendrick

Cloyd Heck Marvin Center serves as the campus community center, pro- g services, conveniences, and recreational and social opportunities for nts, faculty, staff, alumni, and guests. Its wide range of facilities provides letting for a variety of programs conducted by the University Program d; the departments of Drama, Dance, and Music; and other student and ty organizations.

two-board structure, representative of all elements of the University nunity, plays an important role in the day-to-day functioning of the Center. Governing Board and the Operations Board work closely with the full-time in the development of procedures and policies which provide a framework he Center's operation.

DENT HEALTH SERVICE

ctor R.B. Castell, M.D.

Student Health Service is an outpatient clinic designed to assist all students tered on campus with their health needs while attending the University. service, located at 935 22nd Street, N.W. (in the H.B. Burns Memorial ding), assists with health conditions and medical emergencies by advice and tment, proper referral when necessary, and cooperation with other physi- s and medical facilities.

During the academic year, the hours are 9 a.m. to 10 p.m., Monday through day, and 9 a.m. to 12 noon on Saturday. The weekday hours during the mer sessions are from 9 a.m. to 9 p.m.; Saturday hours are 9 a.m. to 12 n. A physician is in attendance during these hours.

For serious illnesses or emergencies that occur when the Student Health vice is closed, students may call the Medical Bureau (223-2200), or go to Emergency Room of the University Hospital for treatment. Charges for h of these services are solely the responsibility of the student.

Charges for services that are not available through the Student Health Serv- such as X-ray and laboratory tests, specialty services, and consultations, must be paid by the student.

The Student Health Service is available only to those students who are cur- tly enrolled on campus in the University. A student who is not currently en- ed, or one who has severed his connection with the University, is ineligible this service. This service is not available between the last day of examina-

tions for a semester or summer session and the completion of regist
the next semester or summer session.

A student intending to train for an athletic team is required to pas
cal examination. The University is not responsible for injuries re
intercollegiate or intramural games, or in any of the activities of th
ment of Physical Education.

HEALTH AND ACCIDENT INSURANCE

In addition to the above service, the Student Health Service Office
ranged for Health and Accident Insurance, on an elective basis, for
students. Arrangements for insurance coverage are the responsibility
student. The University assists in the subscription process by admi
application cards and collecting fees during official registration perio

A student may subscribe and pay for the coverage *only* when he
tuition and other fees at registration. For those few students who regi
the subscription will be available during official late registration. *Sub
during late registration will not be available for those students who pr
registered and failed to subscribe at that time.* Students who participat
Summer Advanced Registration Program must subscribe and pay for
erage on the appropriate date of the Summer Advanced Registration.
who participate in the pre-registration, conducted in April for the fo
Fall Semester, must subscribe for the coverage at the time of pre-regi
in April. The fee will be included with the tuition bill and must be
August 1.

The fee charged provides coverage on a 6-month basis—September
February for those subscribing for the fall, and March through Aug
those subscribing for the spring. The coverage is effective, with mino
tions (see available folder), whether the student is at the University, a
or elsewhere. The fee charged at each official registration period will
payment required for full coverage for a 6-month period and must be
full at the time of subscription.

The policy contract is between the individual and the insurance carr
is accepted at any hospital or emergency room that accepts this type o
cal coverage. Details of the policy are contained in a folder available
Student Health Service Office.

COUNSELING CENTER

Director E.L. Phillips

The Counseling Center offers services to students enrolled in the Uni
which are designed to assist individuals in the diagnosis and treatment o
educational, personal, and social problems; to diagnose problems lead
academic difficulties; to offer vocational counseling and programmed i
tion; and to refer individuals to qualified agencies for assistance with pr
not handled by the Center. Behavior therapy, individual and group
therapy, and individual and group counseling are available.

The Center also provides special assessments including diagnostic me
prescribed by the School of Engineering and Applied Science, admissio
for the University and for other selected educational institutions, and
selected assessments for business and industry.

—Students who are currently registered as degree candidates in the sity are entitled to one interview without charge. If the student decides tinue to use the services offered, a minimum flat fee of $30 will be d for short-term treatment. Fees for testing and long-term treatment upon the services involved. All fees are payable at the Counseling Office.

RNATIONAL STUDENTS

r W.A.R. Walker

ational House is the campus center for students from foreign countries. es also as the headquarters of the International Students' Society, which o promote international friendship and understanding by welcoming to mbership students from all countries, including those from the United

Adviser to International Students has his Office in International House available each day throughout the school week for consultation on im- ion regulations and on any matters concerning the social and academic e of the foreign student.

ENT AND ALUMNI CAREER SERVICES OFFICE

Services Officer Gertrude McSurely

tudent and Alumni Career Services Office provides assistance to degree- g students and alumni seeking full-time, part-time, temporary, or perma- mployment. All students are urged to become acquainted with the services Office early in their college experience.

nseling concerning trends in employment, areas of employment, various d examination announcements, preparation for job interviews, resume- , and other procedures for successful job application are always avail- pecific career openings; an on-campus recruitment program by business, y, government, and school systems; volunteer opportunities; and part- nd temporary jobs for students while attending school are all part of this . Referral and placement functions of the on-campus College Work-Study m are handled by the Student and Alumni Career Services Office. r credential files initiated by persons seeking employment in all educa- fields are maintained in this Office.

understanding and knowledgeable approach to avenues of service for people who do not find career satisfaction in the structured systems of ss, government, and education is also provided in the Student and Alumni Services Office.

IOUS LIFE

niversity recognizes the contribution that religion makes to the life of its s and encourages them to participate in the various religious organiza- of their own choice. Catholic, Jewish, and Protestant bodies sponsor groups and form a link between the University and the religious com- . The advisers of the religious organizations are available for counsel-

Religious services in various traditions are provided regularly for
versity community as announced.

STUDENT ACTIVITIES

Director of Student Activities David Speck
Activities and Orientation Coordinator John Perkins
Program Coordinator Janet Hardy
Assistant to the Director Irene Cavanagh

The offices of the Vice President for Student Affairs, the Dean of
the Director of the Cloyd Heck Marvin Center, and the Director of
Activities are responsible for all co-curricular phases of student life.

STUDENT ACTIVITIES OFFICE

The Student Activities Office assists individual students and organiza
program development, campus leadership training, and participation in
projects—both within the University community and in the community
This Office also serves as a central clearinghouse for development an
tenance of a master activities calendar—for registering and assisting
organizations, for scheduling facilities and events, and for inform
University community of the many activities and programs which ca
the educational experience. Students interested in participating in th
social, cultural, or extracurricular phases of University life should
themselves with the facilities and functions of the Student Activitie
and its staff.

UNIVERSITY COMMITTEES AND ORGANIZATIONS

The George Washington University is an active, working community
student involvement has become a motivating force in the governance
University through the committee structure. This involvement has
develop policies and programs beneficial not only to the student pop
but to the total University community. While serving on these com
student members are able to participate in the formulation and the app
of ongoing institutional policy.

There are numerous committees on which members of the student b
able to serve. The Student Activities Office has a relatively complete
major committees, and interested students should inquire there for
information. Additional information is also contained in the *Student Ha*
A brief description of some of these committees follows:

Joint Committee of Faculty and Students.—This administrative co
created in response to a resolution of the Faculty Senate, is composed
faculty members, seven student members, and other ex officio members
bers of this Committee are appointed by the President.

The Committee is officially charged to "facilitate all efforts to
student-faculty relations," to "encourage student recommendations in
of Senate policy-formulation which affect student life," and to "reco
changes in the 'Rules and Regulations Governing the Conduct of
Life.'" The Committee has specific advisory powers in many areas co
student-faculty relations and the interests of the student body.

nmittee on the Judicial System.—The Committee on the Judicial System
posed of three faculty members and three student members, one of whom
Chairman of the Student Court, one a student member of the Student-
y Committee on Appeals, and one selected from the campus at large.
Committee on the Judicial System works closely with the Executive
ary to the Judicial System to make sure that the various hearing bodies
er committees include the following: the Committee on University Park-
ne Committee on Religious Life, the Committee on Sponsored Research,
ommittee on Student Publications, and the Committee on the University
tore.

DING COMMITTEES IN SCHOOLS AND COLLEGES

chools and colleges maintain various standing committees concerned
pecific aspects of the college program; the majority are faculty com-
s. One of particular interest to students, the Columbian College Advisory
ittee on Honors Program, includes three student representatives, gen-
chosen from alumni of the sophomore-year honors program. This Ad-
Committee selects leaders for honors seminars in the College, reviews
ndent-study projects, and advises concerning the merits of these projects.
ions to Committee membership are initiated by the College.

TUDENT NOMINATING BOARD

ll-student board was created by the President upon the recommendation
Joint Committee of Faculty and Students in February, 1971. The Board
tablished "to make appointments to all University Committees that have
t members where there is no other existing means by or through organiza-
charter or constitution to do so."
members of the Student Nominating Board are the President of Mortar
the President of Omicron Delta Kappa; the Chairman of the Graduate
of Arts and Sciences Student Advisory Council; and one representative
each of the following: Residence Hall Association, Engineers' Council,
Committee of Faculty and Students, Student Bar Association, and Asso-
of Medical Students.

ROGRAM BOARD

niversity Program Board, through its student committee structure and
rship, provides a variety of cultural, social, and recreational programs
npus. As a result, students are afforded opportunities to broaden their
ional experiences by developing and participating in those programs
contribute to the life of the University community.
ent membership on the Program Board is composed of three executive
(Chairman, Vice Chairman, Secretary) elected from the general student
n the spring semester, and seven committee chairmen appointed after
ection. The seven committees of the Program Board are the Public
ns Committee, Concert Committee, Community Relations Committee,
ming Arts Committee, Visual Arts Committee, Political Affairs Com-
and Social Committee. These students work with appointed faculty
rs and professional staff from the Division of Student Affairs in carrying
ir many programs and activities.

STUDENT ORGANIZATIONS

The following is a representative list of organizations active at the during 1971-72. More complete information on these and other or is available at the Student Activities Office.

DEPARTMENTAL CLUBS

American Civilization Undergraduate Majors, Anthropology Club Club, German Club, Russian Club.

FORENSICS AND PERFORMING ARTS

Enosinian Debating Society; George Washington University Dance Station WRGW; University Chamber Choir, Chorus, Orchestra; Players. A variety of programs is presented by these groups throu academic year.

HONOR SOCIETIES

Phi Beta Kappa.—A national honor society recognizing "outstand lectual capacity well employed" in the field of liberal arts and science and junior students who are candidates for the degree of Bachelor of Bachelor of Science in Columbian College and who have shown broad interests, distinguished scholarly achievement, high character, general and scholarly ideals may, to a number not exceeding 15 per cent of a elected to membership by the Faculty members of the Alpha Chapte District of Columbia. Seniors and juniors in other schools of the U who meet the above requirements are also eligible for consideration fo bership, provided that their program of studies includes appreciable the liberal arts.

Sigma Xi.—A national scientific honor society, the purpose of whic encourage original investigation in science, pure and applied. Outs graduate students in the sciences are eligible for full membership, and graduates who have shown marked ability in research may be elected t ciate membership.

Delphi.—An intersorority honorary society.

Delta Phi Alpha.—A national German honor society.

Delta Sigma Rho-Tau Kappa Alpha.—A national forensic society.

Eta Sigma Phi.—An honorary fraternity for students of Latin or Gr

Iota Sigma Pi.—A national chemical society for women.

Mortar Board—A national society for junior or senior college women. sing leadership, scholarship, and service.

Omicron Delta Epsilon.—A national economics society.

Omicron Delta Kappa.—A national fraternity for junior and senior emphasizing leadership in extracurricular activities.

Phi Eta Sigma.—A national fraternity, established to encourage and r high scholarship and attainment, membership in which is limited to those man men who attain a scholastic average of at least 3.50 or the equiv

Phi Sigma Tau.—A national philosophy honor society.

Psi Chi.—A national psychology fraternity.

a Alpha Eta.—A national speech and hearing fraternity.
a Delta Pi.—A national Spanish honor society.

EST AND SERVICE ORGANIZATIONS

People's Union, Caravansary International, Cheerleaders, Chess Club, K, College Republican Club, Committee for an All-University Govern- Freedom Leadership Foundation, Gay Peoples' Association, GW Student , GW Women's Liberation, Indian Cultural Association, International Stu- Society, Jewish Activist Front, Korean Student Association, Nichiren u Study Academy, Organization of Arab Students, Parachute Club, Pre- al Society, Project Share, SERVE, Student-Faculty Union for an Open rsity, Students for World Unification, Student Mobilization Committee to he War in Southeast Asia, Veterans and Reservists Against the War, g Americans for Freedom, Young Democrats, Young Socialist Alliance.

ESSIONAL ORGANIZATIONS

Chi Sigma (chemistry), Alpha Kappa Psi (commerce and economics), Nu Alpha (national professional transportation fraternity), Interna- Association of Students in Business and Economics, Personnel Society, Delta Gamma (graduate), Phi Delta Kappa (education), Pi Lambda Theta cation), Sigma Delta Chi (journalism), Student Health Care Organization.

LICATIONS

demic Forum (student-faculty journal), *The Cherry Tree* (the yearbook), *University Hatchet* (semi-weekly newspaper), *Journal of International and parative Studies* (publication of Consortium graduate students), *The Rock k* (literary magazine), *Student Directory, This Week* (weekly list of sched- events).

IGIOUS ORGANIZATIONS

tist Student Union, B'nai B'rith Hillel Foundation, Christian Science Or- zation, Eastern Orthodox Club, Lutheran Student Association, Newman ndation, Religious Society of Friends, Unitarian-Universalist Club, United istian Fellowship, Wesley Foundation.

IAL FRATERNITIES

a Tau Delta, Kappa Sigma, Phi Sigma Delta, Sigma Alpha Epsilon, Sigma Sigma Nu, Sigma Phi Epsilon, Tau Kappa Epsilon.

IAL SORORITIES

a Gamma, Kappa Alpha Theta, Kappa Kappa Gamma, Phi Sigma Sigma.

RTS

University is a member of the National Collegiate Athletic Association the Eastern College Athletic Conference. Its teams participate against

major universities throughout the Midwest and Eastern Seaboard. collegiate program is comprised of basketball, baseball, soccer, t wrestling, rifle, and crew.

The University offers a broad program of intramural sports a both men and women through the Department of Physical Educati and Recreation.

MAJOR PROGRAM EVENTS

Recreation Program.—The University Recreation Association an partment of Physical Education, Health, and Recreation arrange a w of sports and recreational activities and special events for all students.

Concert Series.—The University Program Board sponsors conc semester at which nationally known entertainers perform.

Orchestra and Concert Series.—The University Orchestra and Chor facets of the lively arts available to students either as credit cour extracurricular activities. The Chorus presents major performances to versity community four or five times a year, including regular Chris Spring concerts. The University Orchestra presents four or five concer

Theatre.—The Drama Department produces seven major plays d year on the new proscenium/thrust stage in the Dorothy Betts Marvin or in Lisner Auditorium. Several original and experimental plays duced in the Experimental Theatre. Students have the opportunity to p in all aspects of theatre and may receive credit toward their B.A. o degrees for some of their production work.

Art Exhibits.—The work of locally, nationally, and internationally artists is shown in monthly exhibits in the Dimock Gallery in Lounge and in the art gallery of the Cloyd Heck Marvin Center. cooperation of the Curator of Art, an annual student art exhibit is p



COLUMBIAN COLLEGE OF ARTS AND SCIENCES

Dean C.D. Linton
Assistant Deans Barbara Dunham, J.L. Métivier, Jr., R.C. Rutledge, H.E. Yeide, Jr.

FACULTY*

ssors J.G. Allee, Jr., Joseph Aschheim, Otto Bergmann, J.W. Brewer, H.F. ght, R.G. Brown, J.F. Burks, A.E. Burns, W.E. Caldwell, G.V. Carroll, . Cisin, J.H. Coberly, C.W. Cole, T.F. Courtless, Jr., Milton Crane, Robert vis (*Research*), R.H. Davison, Louis De Alessi, A.H. Desmond, Julian senstein, Nicolae Filipescu, J.A. Frey, C.E. Galbreath, R.N. Ganz, Jr., Jaceline Goodnow, Wood Gray, F.S. Grubar, Andrew Gyorgy, I.B. Hansen, C. Haskett, G.F. Henigan, P.H. Highfill, Jr., J.W. Hillis, H.C. Hinton, H. Hobbs, Ching-Yao Hsieh, R.G. Jones, J.W. Kendrick, R.W. Kenny, ewitt Kenyon, J.C. King, A.D. Kirsch, D.C. Kline, G.M. Koehl, W.H. raus, J.F. Latimer, Thelma Z. Lavine, H.L. LeBlanc, L.P. Leite, Sar Levi-n, B.I. Levy, J.B. Levy, R.K. Lewis, H.W. Lilliefors, C.D. Linton, T.P.G. verman, W.A. MacDonald, G.E. Mazzeo, G.E. McCandish, M.L. Meltzer, M. Merriman, J.L. Métivier, Jr., F.H. Michael, Charles Milton (*Research*), C.C. Mondale, R.H. Moore, J.N. Mosél, S.C. Munson, Gardner urphy (*Visiting*), C.R. Naeser, David Nelson, Benjamin Nimer, H.J. Parry *Research*), T.P. Perros, E.L. Phillips, Francisco Prats, R.E. Purcell, J.P. esing, Jr., J.W. Robb, H.M. Sachar, B.M. Sapin, R.H. Schlagel, W.E. hmidt, R.P. Sharkey, Chung-wen Shih, R.H. Shumway, F.R. Siegel, Henry lomon, Herbert Solomon, George Steiner, R.W. Stephens, E.L. Stevens, T. Stewart, Jr., Theodore Suranyi-Unger, Jr. (*Research*), Choy-Tak Taam, eza Teleki, R.B. Thompson, R.C. Vincent, R.D. Walk, R.H. Walker, Jr., L. Weintraub, E.R. Weismiller, D.G. White, R.K. White, R.E. Wood, elen Yakobson, A.J. Zuchelli

nct Professors T.E. Bowman, Yvonne Brackbill, J.C. Broderick, A.J. aron, Rose Caron, T.F. Carroll, F.A. Chace, Jr., Barend de Vries, Frederick utheim, M.L. Jones, E.G. Kauffman, L.S. Kornicker, Raymond Manning, P. Miller, R.P. Multhauf, J.W. Pierce, H.A. Rehder, I.G. Sohn

ciate Professors Eugene Abravanel, Ruth Bari, Bette Barton, Lee Bielski, S. Bowling, Sr., A.D. Britt, Letitia Brown, E.A. Caress, A.E. Claeyssens, Jr., G. Coates, Mary Ann Coffland, Linda DePauw, R.M. Dunn, Jr., G.C. ds, C.F. Elliott, Roland Fleischer, I.I. Glick, Marvin Gordon, M.D. Green, B. Griffith, S.E. Haber, Dagmar Henney, C.J. Herber, P.P. Hill, Mary

* President of the University, the Vice President for Academic Affairs, the Registrar of the sity, the Director of Admissions of the University, and the Director of Libraries of the Uni- are ex officio members of the Faculty of Columbian College of Arts and Sciences.

Holman, R.L. Humphrey, Jr., C.T. Ireland, S.G. James, Eva Johns
Johnson, S.A. Karp, Irving Katz, Young Kim, Virginia Kirkbride
Lee, Patricia Lengermann, J.F. Lewis, C.A. Linden, R.C. Lindholm
Long, W.L. Marsh, Muriel McClanahan, F.L. Minn, J.A. Morgan,
Moser, Nadine Natov, G.A. Olkhovsky, Kittie Parker, Robert Par
Pfuntner, Bernard Reich, W.M. Reynolds, Charles Rice, Philip
W.W. Rowe, D.A. Rowley, R.C. Rutledge, Pilar Sáenz, S.O. Sch
Schwoerer, D.E. Silber, W.A. Smith, Carl Steiner, R.H. Tanck (*Re*
D.H. Teller, Klaus Thoenelt, Irene Thompson, Richard Thornto
Tilkens, W.L. Turner, C.E. Tuthill, Dewey Wallace, Jr., P.J. W
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C.R. Mann, Henry Merchant, B.M. Mergen, Mary Miller, Margare
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W.C. Parke, E.O. Pederson, Judith Plotz, J.A. Quitslund, Sonya
Joan Regnell, Fredrica Rosenberg, L.A. Rothblat, P.L. Sargent (*V*
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Peskin, Sister Mary Francis Slattery, P.E. Spiegler
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* The Dean of Columbian College of Arts and Sciences is an ex officio member of all c
† Elected by the Faculty.

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TTEE ON ADMISSION AND ADVANCED STANDING

Koehl (*Chairman*), Letitia Brown, A.D. Kirsch, T.P. Perros, J.L. r, Charles Rice, Lawrence Winkler

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TTEE ON STUDENT ADVISING

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RY COMMITTEE ON HONORS PROGRAM

eide, Jr. (*Chairman*), Linda DePauw, R.N. Ganz, Jr., W.B. Griffith, azzeo, C.C. Mondale, R.B. Thompson, three student representatives

TTEE ON USE OF CORRECT ENGLISH

loore (*Chairman*), J.G. Allee, Jr., G.F. Henigan, Muriel McClanahan, illson

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Desmond (*Chairman*), J.W. Brewer, J.A. Frey, R.H. Moore, W.M. ds, R.C. Vincent, R.K. White

ISORY COMMITTEE ON DEGREES ADMINISTERED BY THE COLLEGE ERAL STUDIES

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AN

ullivan, Jr. (*University Trustee*), *Thomson and McKinnon, Auchincloss, Washington, D.C.*

by the Faculty.

ouncil serves both Columbian College of Arts and Sciences and the Graduate School of Sciences. The President of the University, the Vice President for Academic Affairs, the Columbian College of Arts and Sciences, and the Dean of the Graduate School of Arts ces are ex officio members of the Council.

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INTRODUCTION

Since its founding in 1821, Columbian College of Arts and Sciences, the
arts college of the University, has continued to expand and develop wi
city of Washington. Its central situation makes participation in the life
nation's capital convenient for resident students. The cosmopolitan nat
the student body reflects the atmosphere of a great world capital. Becau
students come from the fifty states and from ninety foreign countries, cla
cussions and casual student conversations are enriched by a challenging
iety of viewpoints.

Throughout its history, the College has kept pace with, and often led,
ments of reform in higher education. Sensitive to the rapidly changing pa
of student and social needs, notably the increasing maturity and knowled
the modern incoming freshman, the College in 1971 inaugurated swe
changes in its academic programs. In brief summary, the changes are de
to (1) permit the able student to earn his baccalaureate degree in less
the standard four years, either by earning credit through a wide vari
examinations or by performing with excellence within a 90-semester-hour
year program; (2) provide each student with a greater opportunity to d
his own academic program by eliminating almost all specific course re
ments except in the major field; (3) encourage an early and close assoc
between the student and individual faculty members in the field of the stu
chief interest; and (4) foster a spirit of community and shared respons
between faculty and student.

Opportunities exist for double majors; interdisciplinary programs; an
the case of the student who finds no existing major or program suitable
interests or needs, special interdisciplinary programs which may be deve

e student, in consultation with departmental advisers and with the final val of the Committee on Programs.
lumbian College offers programs leading to the degrees of Associate in Bachelor of Arts, Bachelor of Science, and Bachelor of Science in Medical nology; prelegal and premedical programs; the first two years of the ssorial programs in Education and in Public and International Affairs.

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mbian College has degree-granting authority over the off-campus programs ng to the degrees of Associate in Arts in General Studies, Bachelor of eral Studies (areas of concentration in history, mathematics, political ce, and psychology), Bachelor of Science in Environmental Health, Bache- of Science in Geodetic and Cartographic Science (areas of concentration artography and geodesy), and Bachelor of Science in Oceanography.
hese off-campus degree programs are administered by the College of Gen- Studies. For further information see the *College of General Studies* cata- e.

THE COLUMBIAN COLLEGE PROGRAM

Columbian College program is a contemporary application of the historic ral arts tradition. Its purpose is to enable the student to develop both his ticular abilities and his general awareness as a human being. It demands of student a thorough acquaintance with one major area of learning and at same time an understanding of how that specialization fits into the larger text of the scientific, social, and moral problems which confront modern n. It stresses not merely expertness but that broadly enlightened expertness ich encourages its graduates to grow through the years in ability and wisdom.

HOMORE YEAR IN PARIS PROGRAM

shmen who have received grades of *C* or higher in all course work dur- the first semester may be eligible to participate in the George Washington iversity-American College in Paris Sophomore Year in Paris Program. alified students will be encouraged to accept this opportunity to profit from cultural and intellectual riches of Europe by spending their second year ng and studying in Paris. Credits earned in this Program will be transfer- le toward a degree in Columbian College of Arts and Sciences. Since all rses are taught in English, a knowledge of French is not mandatory, but is irable. Students with no training in the French language will be required to ticipate in an intensive five-week language program in Paris prior to the ginning of the academic year.

ENTRANCE REQUIREMENTS

od character and an academic background appropriate for the program of dies contemplated are required.
Requirements for admission to the freshman class are as follows:
1. An acceptable certificate of graduation from an accredited secondary

school, showing at least fifteen units* which must include four years at least two years of one foreign language; two years of science with laboratory instruction; two years of social studies, one of which American history; and two years of college preparatory mathematics of algebra, or the equivalent, is prerequisite to courses in chemistry istics; and one unit in algebra and one unit in plane geometry, or lent, are prerequisite to courses in mathematics and physics.

2. The principal's statement that the applicant is prepared to undertake lege work.

3. College Entrance Examination Board scores submitted on the Aptitude Test and the English Composition Achievement Test.

It is recommended that the examinations be taken in December or Scores on tests taken in the junior year may be submitted. Arrangements tests are the responsibility of the applicant and should be made with cational Testing Service, 20 Nassau Street, Princeton, N.J. 08540, Center Street, Berkeley, Calif. 94704, not less than one month before of the test. In applying for the test, the applicant should specify that be sent to the Office of Admissions, George Washington University, ton, D.C. 20006.

The College Entrance Examination Board tests are preferred; however, American College Testing battery scores will be accepted. The applicant request that these scores be sent to the Office of Admissions directly American College Testing Program, Iowa City, Iowa. It is recommended the applicant take the tests in October of the senior year.

The Committee on Admission and Advanced Standing will consider quacy of the qualifications of an applicant who, because of unusual stances, does not present all of the formal requirements stated above Committee may prescribe appropriate scholastic-aptitude tests of the U

REGULATIONS

Regulations regarding ADMISSION, REGISTRATION, FEES AND FINANCIAL *stated on pages 23-34; other University regulations, on pages 45-53.*

ACADEMIC WORK LOAD

A full-time student not on probation may take a course load of as much 17 semester hours. A student employed more than 20 hours a week not on probation may take not more than 10 hours.

The amount of work taken by a student on probation is limited by the mittee on Scholarship.

A full-time student who, during the immediately preceding semester received no grades below *B* and has earned grades of *A* in three courses at least 9 semester hours may take 18 or 19 hours. An employed student during the immediately preceding semester, has received no grades below and has earned grades of *A* in two courses totaling at least 6 semester may not take more than 12 hours.

* A unit represents a year's study in a secondary school subject, including in the aggregate less than 120 sixty-minute periods, or the equivalent, of prepared classroom work.

student who accepts employment after registration or at any time during
nester must report that fact immediately to the Dean so that his program
be adjusted, if necessary.

ENDANCE

student is held responsible for all the work of the course in which he is
tered, and all absences must be excused by the instructor in charge before
ision is made for the student to make up work missed.

OF CORRECT ENGLISH

use of correct English, oral and written, is required in all courses. Any
ent whose English in any course whatever is deemed unsatisfactory may be
rted by the instructor to the Dean and to the Committee on the Use of
rect English. The Chairman of the Committee may assign supplementary
k, without academic credit, varying in amount with the needs of the stu-
t. If the work prescribed is equivalent to a course, the regular tuition fee
harged. The granting of a degree may be delayed by failure to make up
such deficiency in English to the satisfaction of the Committee and the
n.

NORS

ophomore Honors Program.—Columbian College offers an honors program
selected sophomores. The program is designed to provide an appropriate
llenge and opportunity for gifted students; to permit early identification of
dents with the highest potential for high-quality graduate work and success
competitive award programs; to introduce educational innovations which
y possibly be applied at a later date to the student body at large; to bring
ether a group of students whose activities will enable them to contribute
re significantly to academic discussion within the University as a whole;
to involve superior students in a program unmistakably identified with the
eral arts ideal of the generally educated man, thus balancing the emphasis on
ncentrated study that is the heart of existing departmental honors programs.
The program normally consists of 2 honors seminars (see page 317), each
ited to approximately 15 students. Each seminar carries 3 semester hours
credit, and represents elective hours in the student's program. Directors of
seminars invite expert faculty members from different fields to assist in
cussion of particular problems. Students may elect a program of independ-
study in place of the second seminar.

Participants in the Honors Program are selected at the end of their first year
the basis of an application to the program. All students who earn four grades
B or better in their first semester are automatically eligible to apply. Other
dents doing high-quality work may apply on the recommendation of two of
ir instructors.

A student will have the designation "sophomore honors" entered into his
rmanent record if he (1) completes successfully 2 semesters of honors work
d (2) earns grades of *B* or better in 16 courses during his first two years of
dy.

Dean's List.—The name of every student who takes a minimum of 15 semes-

ter hours in any one semester, who receives grades of *A* in at l
cent of the course work taken in that semester, and who has no g
or *F* for that semester, is placed on the Dean's List for that seme

ACADEMIC STANDING

A student who is not suspended or on probation is considered to
standing.

The following rules governing probation and suspension are ap
stated to students enrolled for a full-time program (12 semester hours
during the fall or spring semester. Students enrolled for less than 1
hours during the fall or spring semester and students enrolled during
mer sessions are subject to probation or suspension on the basis of th
for four courses (3 or more semester hours of credit each), or multiple
rather than on their record in any one semester.

PROBATION

A student who in one semester receives two grades of *F* in courses
3 or more semester hours of credit each, or the equivalent, is placed o
tion. A student in his first semester on probation who receives one gr
in such a course will be continued on probation for a second semest
grades of *D* will be treated as equivalent to one grade of *F* in
the student's probation status. A student on probation taking 12
semester hours whose grades are all *C* or better is removed from pr

SUSPENSION

A student who in one semester receives grades of *F* in three courses
3 or more semester hours of credit each, or the equivalent, is suspen
student in his first semester on probation who receives two or more gr
F in such courses is suspended. A student who receives one or more
of *F* in such courses in any later semester on probation is suspende
grades of *D* will be treated as equivalent to one grade of *F* in a
the student's suspension status.

The minimum period of academic suspension is one fall or one spr
mester. Final dates for applying for readmission are the same as thos
erning "Undergraduate Admission" (see pages 23-24). A suspended
seeking readmission must submit evidence to the Committee on Ad
and Advanced Standing that during his absence from the University he
conducted himself as to indicate that he will profit by readmission. A
suspended twice for poor scholarship will not be readmitted.

MID-SEMESTER WARNING

When at the end of the sixth week of each semester, instructors file in the
of the Dean the names of freshman and sophomore students who are
unsatisfactory work, a notice of Warning is sent to the student and
filed with the appropriate adviser. A "Warning" constitutes notice to th
dent that he should consult his instructor and adviser at the earliest oppor

SPONDENCE AND HOME-STUDY COURSES

edit is given for work done by correspondence or in home-study courses.

CLASSIFICATION OF STUDENTS

shman is a student who has completed less than 30 semester hours. dent becomes a *sophomore* when he completes 30 semester hours. A stu- becomes a *junior* when he completes 60 semester hours. A student becomes *or* when he completes 90 semester hours.

unclassified student is one who is not a candidate for a Bachelor's degree nally because he already holds one), but who wishes for valid academic ns to take a limited program for a limited time. Registration in this status rmitted only with the prior approval of the appropriate Dean's Council.

THE FRESHMAN YEAR

reshman is given the opportunity of taking a wide range of liberal arts ects—Humanities, Natural and Mathematical Sciences, Social Studies— as a means of laying the groundwork for his more concentrated major-field y and as a means of determining what academic area is best adapted to nterests and aptitudes.

ISORY SYSTEM

h freshman is provided with two kinds of counseling. *Academic* advising is ormed by members of the Faculty selected for their knowledge of academic grams, and each student makes up his program in consultation with the ser assigned to him before registration. *Personal* counseling is available ugh the Office of the Dean of Students. All students are encouraged to ntain close contact with their advisers.

tudents who intend to transfer after the sophomore year to the School of cation or the School of Public and International Affairs are assigned ial advisers to assist them in planning their programs.

n academic warning system permits early attention to students whose work below required standards. In such cases, students are required to consult larly with their advisers. On request, copies of academic warnings or pro- on notices may be sent to parents or guardians, who are themselves wel- e to meet with members of the advisory staff.

UIRED PLACEMENT EXAMINATIONS

nglish.—Students whose College Board English Composition Achievement scores suggest inadequate preparation may be assigned to Engl 1*x* or be tested in vocabulary, spelling, grammar, standard usage, and writing before placement in either Engl 1*x* or 1. Students whose scores indicate ked superiority will be allowed to waive the Engl 1 requirement.

oreign Languages.—A student who has not been granted advanced standing who wishes to continue in college the language begun in high school must a placement examination in one of the following: Chinese, French, Ger-

man, Greek, Hebrew, Italian, Latin, Russian, or Spanish. Upon co
the examination, assignment is made to the appropriate course.

Mathematics.—New students registering for Math 30 are require
registration, to take a placement examination in algebra and trigo

SECOND-GROUP COURSES

A qualified freshman or sophomore may, with the permission of the
concerned, take second-group courses (courses numbered 101-200).

PROFESSIONAL COURSES

Except for majors in Applied Mathematics and for students intendin
for the combined degrees of Bachelor of Arts and Doctor of Medic
degree of Bachelor of Science in Medical Technology, no more than
of professional courses, e.g., courses offered in units of the Univer
than Columbian College, may be included in the 120 hours require
Bachelor's degrees in Columbian College. Students electing profession
under this rule must obtain the approval of the Dean before regist

FOREIGN LANGUAGE REQUIREMENT

In major programs requiring foreign languages a student must comp
factorily the equivalent of two years of college work in a singl
language.

A student offering for admission four acceptable high school u
single foreign language, or the equivalent, is not required to take an
language.

A student who offers less than four units and wishes to continue
language must take the language placement test.

In many instances foreign languages are required or recomme
preparation for advanced work. The student should consult his advise
appropriate foreign languages may be included, when necessary, in his

EARNING CREDIT OR WAIVING REQUIREMENTS BY EXAMINATION

A student may earn semester-hour credits up to a maximum of 30 b
waive curricular requirements without limitation, by performing satis
on any or all of the following tests: Advanced Placement Tests (se
24-25), Achievement Tests (may be used to waive requirements only),
Level Examination Program, Special Examinations—provided by the
ments of Columbian College of Arts and Sciences on an individual basis.
a waiver examination does not entitle the student to any semester hours o

Achievement Tests.—See page 26.

College-Level Examination Program (CLEP).—CLEP offers two t
examinations:

CLEP Subject-Matter Examinations—offered in 27 subject areas. The
measure achievement in the equivalent of specific college-level courses.
cate credit—by passing the examination and by passing the equivalent c
is not permissible.)

CLEP General Examinations—offered in five areas: Mathematics,
Sciences, Humanities, the Natural Sciences, and English Composition. (C

ced standing—is not given for the General Test in English Composition.)
eligible to take the CLEP General Examinations, a student must have
out of secondary school for three years or more.
cial Examinations Offered by Departments.—A student may request any
tment of Columbian College to offer him a special examination covering
bject matter of any specific course. (If an appropriate CLEP Subject-
Examination is available, the department may choose to employ it.)
udent performs satisfactorily, he may receive credit (advanced standing),
of a requirement, *or both*, at the discretion of the department. Special
tmental examinations will normally be of at least three hours' duration.
of $25 for each course examination is charged for preparing, administer-
nd grading.



DECLARATION OF MAJOR

The student is encouraged to select his major field early, normally n
the end of the freshman year. He should obtain the appropriate
Office of the Dean and the approval of his major department. Th
receives academic guidance from a faculty adviser in his major-field

COLUMBIAN COLLEGE GENERAL COURSE REQUIREMENTS

All candidates for the degree of Bachelor of Arts or Bachelor of
admitted to a general arts and sciences curriculum until they choo
field. Except for two general course requirements, all curriculum re
leading to the degrees of Bachelor of Arts and Bachelor of Science
lished by the various major field departments or programs.

The two general requirements are the following:

1. Each student must, during his freshman year, demonstrate
achievement in the field of English Composition, either by examina
taking Engl 1 or 1*x*, and Engl 2 or 4.

2. Each student at some point in his college career must undertake
ingful initiation" into the three divisions of knowledge: Humanities
and Mathematical Sciences, and Social Studies. As each major
normally represent one of these three areas, the requirement may b
by taking no less than 6 semester hours in approved introductory c
6 semester hours in approved advanced courses if the student is qua
receives the instructor's permission, in any of the two categories o
offered by departments or programs listed below in which the studen
field is not represented:

Humanities	*Natural and Mathematical Sciences*	*Social Studies*
Art	Biological Sciences	American Civili
Classics	Chemistry	Anthropology
East Asian Languages and Literatures	Geology	Economics
English	Mathematics	Geography and Regional Scie
Germanic Languages and Literatures	Physics	History
Music	Statistics	Journalism
Philosophy		Political Science
Religion		Psychology
Romance Languages and Literatures		Sociology
Slavic Languages and Literatures		
Speech and Drama		

ASSOCIATE IN ARTS DEGREE

The Associate in Arts degree may be granted to a student who has co
60 semester hours in arts and sciences with acceptable grades, and wh
fulfilled the general requirements described above. In addition, the degr
be awarded to Pre-Education, Pre-Public and International Affairs, an
Medical Technology students upon completion of the curriculum specifi

t two years of the appropriate program. The last 15 semester hours of ogram of study must be completed in residence in Columbian College. ent wishing to receive this degree must file an "Application for Gradua- orm and pay the $10 graduation fee at the time of registration for the er or summer session in which he will complete his requirements.

ACADEMIC ADVISING CENTERS

Department has set up Academic Advising Centers where both general tional counseling and specific major-field advising is available to students. ocations and hours of these Centers may be obtained from departmental or from the Office of Columbian College.

the freshman student deliberates his choice of a major, he should consult faculty advisers in as many of these Centers as he wishes. Once a major ected, the student then receives all of his academic counseling from the ing Center of his major department. To declare his major, the student d secure the proper form from the Office of Columbian College, take it s Academic Advising Center, secure the signature of his adviser, and n the form to the Office of Columbian College. No student is considered ve a major until this process is completed.

PREPROFESSIONAL REQUIREMENTS

MEDICAL CURRICULUM

remedical student who intends to work toward a Bachelor's degree fulfills two general requirements of Columbian College (see page 78), and he follow the major field curricula of any Columbian College department. premedical program must be approved by the premedical adviser. For ission to most medical schools the student must have a minimum of 90 ester hours applicable towards a degree in an approved college of arts sciences, and the 90 hours must include

Biology: 8 semester hours. This may be either in general biology or zoology may *not* include separately credited courses in botany.

Chemistry: 8 semester hours of general inorganic chemisty (which may in- e qualitative analysis), including 4 semester hours of laboratory; and 6 to 8 ester hours of organic chemistry, including laboratory.

Physics: 8 semester hours, including at least 2 semester hours of laboratory.

English: 6 semester hours. This may be the usual introductory college course s equivalent.

hile not required for admission, courses in biochemistry, embryology, histology, tics, and mathematics are strongly recommended.

ith the exception of these specific requirements applicants are urged to ow their personal interests in developing their premedical courses of study. ell-balanced program, rather than a specific field, is the criterion by which pplicant is judged. It is not advisable to take courses that appear to cover ect matter in the medical program.

hile well-qualified candidates are eligible for admission after completing minimum 90 semester-hour requirement, the majority of applicants are

found to be better prepared for the study of medicine after fo
college work.

MEDICAL TECHNOLOGY CURRICULUM

First two years of the Bachelor of Science in Medical Technology
See pages 88-89 for a description of the program and the requirem
junior and senior years:

Engl:	Engl 1 or 1*x*, and 2 or 4
Humanities:	Six semester hours selected from one of the follo combinations: Art 31–32; Art 71–72; Engl 51–52; 71–72; Engl 91–92; Mus 3 and 4; Rel 9 and 10 Rel 59–60
Math:	Math 3, 6 NOTE: the Math 3 requirement may be satisfied by fering two years of high school algebra acceptable admission; the Math 6 requirement may be satisfied offering one-half year of high school trigonometry ceptable for admission.
Science:	B Sc 11–12, 111 Chem 11–12, 22
Social Studies:	Six semester hours selected from one of the follow combinations: AmCv 71–72; Anth 1–2; Econ 1–2; G 51 and 52; Hist 39–40; Hist 71–72; P Sc 4 and 6; P 5 and 6; or Soc 1 and 2
Elective:	Courses other than science
	Total

EDUCATION CURRICULUM

First two years in preparation for the Bachelor of Arts in Education
the School of Education:

Engl:	Composition—Engl 1 or 1*x*, 2 Literature—Engl 51–52, 71–72, or 91–92
Math:	Two semesters to supplement senior high school course chosen from Math 3, 6, 9, and 10
*PE:	Any combination of first-group Physical Educatio Health, and Recreation courses
Psyc:	Psyc 22 Psyc 29 (for elementary majors) or 112 (for secondar majors)
Science:	Three semesters (2 in biological science and one physical science or vice versa) to supplement senior hig school courses in those fields, chosen from B Sc 3–4 o

* Freshmen and sophomores are required to take physical education unless they are regis less than 9 semester hours or unless regular employment during the day makes it necessar all classes during the evening hours. Any other exemption will be granted only upon written which has been recommended by the University Physician and approved by the Dean o exempted from the physical education requirement must substitute an equivalent number of hours of electives.

		Semester Hours
	11–12; Chem 3–4 or 11–12; Geol 1–2; or Phys 1 and 2, or 9–10. A secondary education major offering for admission 2 or more acceptable senior high school units in the above areas of science may be exempted from one semester of this requirement	9–12
l Studies:	Hist 71–72, or P Sc 4 and 6 or 5 and 6	6
	Six semester hours selected from one of the following combinations: AmCv 71–72; Anth 1–2; Econ 1–2; Geog 51 and 52; Hist 39–40; Hist 71–72; P Sc 4 and 6; P Sc 5 and 6; or Soc 1 and 2	6
Sp&D:	Sp&D 1 (or 11, if the Department so advises)	3
Elective:		12
	Total	63–66

AL EDUCATION CURRICULUM

o years in preparation for the Bachelor of Science in Physical Education with Specialization in Elementary or Secondary Physical Education in ool of Education:

		Semester Hours
Engl:	Engl 1 or 1*x*, 2	6
PE:	Any combination of first-group Physical Education, Health, and Recreation courses*	4
	PE 103	3
Psyc:	Psyc 22	3
	Psyc 29 (for elementary majors) or 112 (for secondary majors)	3
th/Science:	B Sc 3–4; Chem 3–4; Geol 1–2; Math 9 and 10; or Phys 1 and 2, or 9–10	6–8
ial Studies:	Twelve semester hours elected from any two of the following combinations: AmCv 71–72; Anth 1–2; Econ 1–2; Hist 39–40; Hist 71–72; P Sc 4 and 6; P Sc 5 and 6; Soc 1 and 2	12
Sp&D:	Sp&D 1 (or 11, if recommended by the Department)	3
Elective:		24
	Total	64–66

wo years in preparation for the Bachelor of Science in Physical Education with Specialization in Dance in the School of Education:

		Semester Hours
Engl:	Engl 1 or 1*x*, 2	6
PE:	Any combination of first-group courses in Dance and/or PE 121 and 123*	4
	PE 103, 107, 108, 157	9

men and sophomores are required to take first-group physical education activities courses (or second-group alternative courses) unless they are registered for less than 9 semester hours or egular employment during the day makes it necessary to take all classes during the evening Any other exemption will be granted only upon written petition which has been recommended University Physician and approved by the Dean. Students exempted from this requirement bstitute an equivalent number of semester hours of electives.

Psyc:	Psyc 22, 112
Math/Science:	B Sc 3–4; Chem 3–4; Geol 1–2; Math 9 and Phys 1 and 2, or 9–10
Social Studies:	Twelve semester hours selected from any two of lowing combinations: AmCv 71–72; Anth 1–2; Ec Hist 39–40; Hist 71–72; P Sc 4 and 6; P Sc 5 Soc 1 and 2
Sp&D:	Sp&D 1 (or 11, if recommended by the Departme
Elective:	
	Total

CHINESE LANGUAGE AND LITERATURE*

The first two years in preparation for the Bachelor of Arts degree in Chinese Language and Literature in the School of Public and Affairs consists of a minimum of 60 semester hours. Each st during his freshman year, demonstrate adequate achievement in English Composition, either by examination or by taking Engl 1 Engl 2 or 4. Either while in Columbian College or after admis School of Public and International Affairs, he must also undertak ingful initiation" into the three divisions of knowledge: Humaniti and Mathematical Sciences, and Social Studies. As the major field one of these three areas, the requirement may be fulfilled by tak than 6 semester hours of approved introductory courses, or 6 sem in approved advanced courses if the student is qualified and recei structor's permission, in the Natural and Mathematical Sciences an Studies. Students must include in their program of study Asia 1-2, or Asia 5-6. Asia 5-6 is preferred.

CHINESE STUDIES OR INTERNATIONAL AFFAIRS CURRICULU

First two years in preparation for the Bachelor of Arts degree in Chinese Studies or International Affairs in the School of Public national Affairs:

Engl:	Engl 1 or 1x, and 2 or 4
Humanities or AmCv:	Art 31–32 or 71–72; †Literature (Chinese, Class East Asian, English, French, German, Italian, Slavic Spanish); Mus 3, 4; first- or second-group Philosop courses; Rel 21, 59–60; or AmCv 71–72
‡Language:	Chinese, French, German, Hebrew, Italian, Russian, Spanish

* The degree of Bachelor of Arts with a field-of-study major in Chinese Language and available in Columbian College of Arts and Sciences.
† If a student elects 6 semester hours of literature in any foreign language, this can to satisfy the language requirement.
‡ Asia 5-6 is required for Chinese Studies majors.

		Semester Hours
Science:	B Sc 3–4 or 11–12; Geol 1–2; Math 9 and 10 or 30 and 31; Phys 1 and 2 or 9–10; or one course selected from Stat 51, 53, 91, and one course selected from Stat 97, 105, 111	6–8
Studies:	Econ 1–2; Hist 72, and either Hist 40 or 92; P Sc 4 and 6 or 5 and 6	18
Elective:		6–12
	Total	60

AFFAIRS CURRICULUM

years in preparation for the Bachelor of Arts degree in the field of ffairs in the School of Public and International Affairs:

		Semester Hours
Engl:	Engl 1 or 1x, and 2 or 4	6
Humanities or AmCv:	Art 31–32 or 71–72; †Literature (Chinese, Classics, East Asian, English, French, German, Italian, Slavic, or Spanish); Mus 3, 4; first- or second-group Philosophy courses; Rel 21, 59–60; or AmCv 71–72	6
Language or Statistics:	NOTE: this requirement may be satisfied by 2 years of one foreign language or 12 semester hours of Statistics. Statistics courses taken to fulfill this requirement may not also satisfy the Math/Science requirement below.	12
th/Science:	B Sc 3–4 or 11–12; Geol 1–2; Math 9 and 10 or 30 and 31; Phys 1 and 2 or 9–10; or one course selected from Stat 51, 53, 91, and one course selected from Stat 97, 105, 111	6–8
ial Studies:	Econ 1–2; Hist 40 or 92, and 71–72; P Sc 4 and 6 or 5 and 6	21
*Elective:		7–9
	Total	60

THE BACHELOR'S DEGREES

bian College offers programs leading to the degrees of Bachelor of Arts, or of Science, and Bachelor of Science in Medical Technology.
ooperation with the School of Medicine a seven-year curriculum leading combined degrees of Bachelor of Arts and Doctor of Medicine is offered.

REMENTS FOR THE DEGREES

NCE

the Standard 120-semester-hour Program.—A minimum of 30 semester including at least 12 hours in the major field, must be completed in

is not given for courses elected in Physical Education, Health, and Recreation.
udent elects 6 semester hours of literature in any foreign language, this cannot be used to e language requirement.

residence in Columbian College. *Unless special permission is gra*
Dean to pursue work elsewhere, the work of the senior year must b
in residence. This requirement applies to students transferring with
versity as well as to students transferring from other institutions.

For the 90-semester-hour Program.—The last 60 semester hours
at least 12 hours in the major field, must be completed in residence
bian College.

Summer work may be counted in residence. For regulations governi
who are absent from the University for one semester or more, see "
Registration," page 49.

CURRICULUM REQUIREMENTS

A change in degree candidacy within Columbian College (e.g., from
of Arts to Bachelor of Science) requires the permission of the D
degree requirements effective at the time the change is approved mu

First-group courses may be required as prerequisites to the m
because of their introductory character they cannot be counted as pa
programs. (See "Explanation of Course Numbers," pages 191–92).

TUTORIAL STUDY

A junior or senior of demonstrated capacity, with a special intere
subject matter of a *regularly listed course*, may be permitted to tak
study *in residence* under the personal direction of the instructor, in ac
with the rules of the appropriate department and with the approva
Dean. Credit under this plan is limited to the specific semester hours
designated for each course in the list of courses of instruction. It
frequent and regular conferences between the student and instructor.

THE STANDARD 120-SEMESTER-HOUR PROGRAM

One hundred and twenty semester hours of course work are requi
graduation. In addition to the requirements stated on pages 78, 83-84,
21 hours of course work outside of the major department or program
quired. The student should consult his adviser at each registration ab
choice of courses.

Each student should declare his major as soon as he is able, prefer
the completion of his 30th semester hour. He may change the major on
the consent of the Dean and of the department or committee concerne
he must meet the requirements for the new major in effect at the ti
change is approved.

Students transferring from other institutions or from other schools, co
or divisions in this University, with major requirements wholly or substa
met, must satisfy the residence requirement of Columbian College (sec
83-84).

THE 90-SEMESTER-HOUR PROGRAM

The 90-semester-hour degree program is designed for the exceptionall

t. This program, which leads to the regular Columbian College degrees, it possible to graduate in three normal academic years with a total of mester hours of credit instead of the standard 120. Students in this pro- must complete all of the requirements for the three-year degree in the ter in which he achieves his 90th semester hour.

e requirements for this program are (1) 90 semester hours of credit d in college courses (that is, the 90-hour requirement may not be re- by credit earned through examinations); (2) completion of the chosen -field program and general curricular requirements; (3) grades of *A* in st 45 semester hours of course work; and (4) recommendation of his department or program.

be eligible for this program, the student must show evidence of excep- academic ability by college record, performance in college courses, and appropriate information.

interested student should make application directly to his major-field rtmental chairman or program director as soon as possible, preferably he end of his first year of study. His academic record to that point will, urse, provide a useful criterion of eligibility.

transfer student may qualify for graduation under the 90-hour program ided he satisfies the residence requirement of Columbian College (see pages 4) and earns grades of *A* in no less than 45 semester hours of course work. student who fails to maintain the required academic performance while ying toward the 90-hour degree program simply continues for the standard hour degree.

CHELOR OF ARTS

Bachelor of Arts degree is offered in the following fields:

erican Civilization
erican Literature
hropology
plied Mathematics
plied Statistics
History and Theory
logy
tany
emistry
inese Language and Literature
assical Archeology and Anthropology, studies in
assical Archeology and Greek, studies in
assical Humanities
ramatic Art
conomics
nglish Literature
ne Arts
rench Language and Literature
eography
eology
ermanic Languages and Literatures
History
Journalism
Latin
Latin American Studies
Mathematical Statistics
Mathematics
Music:
  Applied Music
  Music History and Literature
  Music Theory
Philosophy
Physics
Political Science
Psychology
Religion
Russian Language and Literature
Russian Literature and Culture—in Translation
Sociology
Spanish American Literature
Spanish Language and Literature
Speech Communication
Speech Pathology and Audiology
Zoology

COMBINED DEGREES OF BACHELOR OF ARTS AND DOCT MEDICINE

A candidate for the combined degrees of Bachelor of Arts and icine must (1) complete the Medical School entrance requirem plete the general requirements stated on pages 78, 83-84; (3) semester hours in the liberal arts, including a minimum of 30 i courses in Columbian College; (4) obtain the approval of the D bian College at the time of entering the School of Medicine; (5) ommendation of the Dean of the Medical Center at the complet scribed courses in the first year of the School of Medicine, at w degree of Bachelor of Arts will be conferred (professional w another institution will not satisfy the major requirement for degrees); (6) maintain throughout the entire course the sch required for graduation.

BACHELOR OF SCIENCE

The Bachelor of Science degree is offered in the following fields:

Applied Mathematics
Applied Statistics
Biology
Botany
Chemistry
Geology
Mathematical Statist
Mathematics
Physics
Zoology

THE UNDERGRADUATE MAJOR

There are two types of undergraduate majors: the Field-of-Study Ma Departmental Major. Three majors, Latin American Studies, Classi ology and Anthropology, and Classical Archeology and Greek, altho departmental in nature, are governed by the regulations of the De Major.

Field-of-Study Major

Each Field-of-Study Major covers a carefully worked out field of co study and is under the supervision of the appropriate department Columbian College Committee on Studies.

The Field-of-Study Major requires no specific program of courses, the student is required to meet the over-all general requirements for gree (at least 120 semester hours of satisfactory work). Ability to pass jor Examination is assumed to be a convincing demonstration that the possesses the breadth, depth, and quality of knowledge of his major usu fined in terms of semester hours, courses, and grades. Information field is obtainable from the department. The prospective student shoul himself under the direction of the appropriate adviser immediately up claring his major.

The Field-of-Study Major places special emphasis on the intellectual opment of the individual student. Programs in the same major may depending upon the individual student's background, previous study, an tudes. The student is expected to consult his adviser frequently, and th cial proseminar offered in some fields gives him further opportunity for

dvice and direction in pursuing a program especially adapted to his nd abilities. A close student-adviser relationship is essential for the stu- ccess under the Field-of-Study Major plan.

following Field-of-Study Majors are offered: American Civilization, an Literature, Chinese Language and Literature, English Literature, Language and Literature, History, Religion, Russian Language and re, Russian Literature and Culture—in Translation, Spanish American re, Spanish Language and Literature.

MINAR IN THE MAJOR

eminar is offered in most fields to help the student acquire a coordi- knowledge of his field through reading, study, and laboratory exercises. presentation of the content and methods of the major field as a whole h the organization and coordination of the knowledge obtained in the s formal courses in the major subject and of material not usually in- in such courses. This course is not required, but, if it is elected, strict lance is essential. Six semester hours, but no qualitative grade, may be ed. When registered in this course, the student has the privilege of visit- ubject to the approval of the instructor, any other appropriate course d in the College. (Regular attendance in a course, either for credit or auditor, requires registration and payment of tuition.) Proseminars are only to the student who has been accepted as a candidate under that fic major.

MAJOR EXAMINATION

Major Examination will normally be taken at the close of the senior year; dent on a limited schedule may take it no earlier than one calendar year re graduation. A student who fails to pass a Major Examination may, at discretion of the Committee on Studies, be re-examined at a later regular or-examination period. The Committee on Studies has general supervision he preparation, reading, and grading of Major Examinations. Major Ex- nations are held each semester on dates fixed by the department or depart- nts concerned, but in no case later than December 1 for the fall semester, ril 13 for the spring semester, and August 26 for the summer sessions.

partmental Majors

partmental Majors, unlike Field-of-Study Majors, are defined in terms of edit hours, required courses, and the attainment of the grades of *A* or *B* half of the second-group courses taken in the major field. The minimum ecific requirements for Departmental Majors are listed below the staff instruction of the department concerned. The Chairman of the Department, designated departmental adviser, should be consulted at registration con- rning the student's program of courses; and the entire program, including ectives, must be approved by the Department. The student is also expected consult the Chairman or adviser in all matters affecting his program of udies, such as changes, substitutions, or withdrawals, and especially concern- g his progress in his course. A close student-adviser relationship is desirable. Departmental Majors are offered in the following: American Literature, An-

thropology, Applied Mathematics, Applied Statistics, Art Histo
Biology, Botany, Chemistry, Classical Archeology and Anthr
departmental), Classical Archeology and Greek (interdepartme
Humanities, Dramatic Art, Economics, English Literature, Fi
Language and Literature, Geography, Geology, Germanic
Literatures, Journalism, Latin, Latin American Studies (inte
Mathematical Statistics, Mathematics, Music (Music History
Music Theory, Applied Music), Philosophy, Physics, Political
chology, Sociology, Spanish Language and Literature, Speech C
Speech Pathology and Audiology, Zoology.

Double Majors

A student who completes the requirements of two major fields
matics and Physics, or English and Latin, or History and Ec
may graduate with a double major. A student wishing to gra
double major should consult with advisers in the two departme
and declare both majors on the appropriate forms available in the

Interdisciplinary Programs

Regular Interdisciplinary Programs.—Several programs presen
cluding American Civilization, Classical Archeology and Anthrop
cal Archeology and Greek, and Latin American Studies.

Special Interdisciplinary Programs.—A student who finds no ex
or program suited to his interests or needs may develop a specia
gram of his own, in consultation with appropriate departmen
Final approval of such a program rests with the Committee on Pro
programs with valid and clearly defined goals will be approved.

BACHELOR OF SCIENCE IN MEDICAL TECHNOLOGY

In cooperation with the University Hospital and the Department o
of the School of Medicine, Columbian College offers work leading
gree of Bachelor of Science in Medical Technology, the fourth yea
(12 calendar months) is spent at the University Hospital.

A candidate for the degree must complete the first two years of t
Technology curriculum listed on page 79. A minimum of 60 seme
of the 120 semester hours required for the degree must be spent a
versity (i.e., 30 hours in residence in Columbian College, and 30 ho
Medical Technology Course—Path 115-16, 117-18, 119-20—in the
Hospital). In the junior year, Chem 50 and one course selected from
127, 148, 154, 163, or 164, are required. All or most of the remainin
in the junior year should be selected from nonscience courses. In t
year the candidate must complete the 12-month Medical Technolog
at the University Hospital, which constitutes the major.

Each candidate must make application to take the 12-month Medi
nology Course at the University Hospital; this should be done earl
junior year. While admission to the Columbian College degree progr
not assure acceptance into the Medical Technology Course, George
ton University students are given preference.

mber of scholarships are provided by the University Hospital for the enrolled in the fourth (senior) year of the degree program.
urther information concerning the Medical Technology program call 6.



GRADUATE SCHOOL OF ARTS AND SCI

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HISTORY AND ORGANIZATION

The Graduate School of Arts and Sciences is responsible for advanc
and research leading to Master's degrees and the degree of Doctor of
phy in the arts and sciences. Graduate programs at George Washing
versity were first formally organized under a graduate School in 1905
ing several decades of gradual growth in a number of departments.
the Graduate School was discontinued. Columbian College, the Un
liberal arts college, then assumed responsibility for the Master of
Master of Science degrees, and a newly created Graduate Council
tered all Doctor of Philosophy programs. Professional schools took
bility for advanced degrees in the professional fields.

In 1967 the Graduate Council and the Graduate Division of Co
College were consolidated into a new Graduate School of Arts and
All graduate programs in the arts and sciences leading to the degrees of
of Arts, Master of Arts in Special Studies, Master of Fine Arts, M
Music, Master of Science, Master of Science for Teachers, Master of
in Forensic Science, Master of Science in Special Studies, and Do
Philosophy are under the Graduate School.

In addition, a Master of Philosophy degree is awarded by the School
recommendation of the appropriate department, to students who have
fully completed the General Examination for the Doctor of Philosophy

The School is under the direction of the Graduate Faculty of Arts a
ences. It is the responsibility of the Faculty to set the requirements for
sion to the School, to provide courses and programs of study and resea
its students, to establish academic standards for its degrees, to recomm
the Board of Trustees the awarding of degrees, to lay down regula
needed for the operation of the School, and generally to supervise its ac

The administration of the School is vested in the Dean, who is Chair
the Dean's Council, which is responsible to the Faculty of the School
policy matters.

ADMISSIONS REQUIREMENTS

lication forms for admission to graduate study are obtained from the Office he Dean of the Graduate School of Arts and Sciences. When completed, e application forms must be submitted to this Office, together with college scripts and letters of reference.

pplicants must have academic backgrounds of excellence, usually with ma- or equivalent, in the fields in which they intend to study for advanced ees. Normally, a *B* average (or equivalent) from an accredited college is ired. With evidence of special promise, such as high Graduate Record mination scores, an applicant may be accepted whose academic record short of *B*. The minimum does not assure automatic acceptance. The artments may, and often do, set higher admissions standards. Moreover, number of spaces available for new graduate students limits the number can be accepted. Students who apply in their senior year must have com- ed their baccalaureate work before registration in the Graduate School and t present evidence of such completion. Students whose native language is English are required to take the *Test of English as a Foreign Language* OEFL), administered by the Educational Testing Service, Princeton, N.J.

pplication for Admission.—Completed applications and all supporting cre- tials must be in the Office of the Dean by February 15 for fall admission for fellowship consideration and by November 1 for spring admission. plications and credentials received after February 15 are not guaranteed sideration, and admission will be on a space-available basis only. Applica- n files completed after May 15 will not be considered for the fall semester.

Readmission.—A student who has failed to maintain continuous registration wishes to resume his graduate program must file an application form to considered for readmission. Readmission is not guaranteed, and the appli- ion is subject to review by the department concerned and the Dean. The dent may be required to take qualifying examinations on the course work mpleted. Application forms are available in the Graduate School Office.

REGULATIONS

gulations regarding ADMISSION, REGISTRATION, FEES AND FINANCES *are ted on pages 23-34; other University regulations, on pages 45-53.*

In addition, the Graduate School publishes a Student Handbook each aca- mic year which contains updated information on the School's policies, regu- tions, and other matters of concern to enrolled or admitted students.

RADES

rades for graduate work are *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, ail; *I*, Incomplete; *W*, Authorized Withdrawal; *CR*, Credit.

The symbol *I* (incomplete) indicates that a satisfactory explanation has been ven to the instructor for the student's failure to complete the required work r a course. The "incomplete" must be made up before the lapse of one cal- dar year. An "incomplete" which is not removed within one calendar year automatically changed to an *F*.

The grade of *I* is also given for all thesis and dissertation res until the thesis or dissertation is completed. Upon the satisfactor of the thesis or dissertation the grade *I* is changed to *CR* automa in these instances is allowed to stand as long as necessary without b to an *F*. The grade of *CR* is given for an *Advanced Reading* (usually numbered 398) course. The grade of *CR* is given for St course).

SCHOLARSHIP REQUIREMENTS

Graduate students are expected to maintain a minimum accumu average of *B* (3.00) in all course work in the program of studie departments may require a higher average. The fields of Art Theory, English, History, Museology, and Psychology require a 3

In the case of a student who receives a grade of *F* for a course gram of studies, the Graduate School will require a departmentall written statement, justifying the student's continuance in the Grad and outlining the program to be followed. Continuation is continge Dean's approval. A course in the program of studies for which ceived cannot be subsequently removed from the program even other course is taken as a substitute.

A student may repeat for credit a course in which he has receiv of *C* or above *only when permitted to do so by the department* unless the course description states that the course may be repeated A written statement to this effect must be submitted for approval to Office by the appropriate departmental adviser. It is then filed Registrar.

A graduate student may take an advanced undergraduate cours numbered 101-200) for graduate credit only upon the approval of and the department at the time of registration. Such approval is gr with the provision that students complete additional work in order graduate credit.

PROGRAM OF STUDIES

The program of studies must be approved by the departmental adviser in the Graduate School Office no later than November 1 for graduate entering in the fall semester, or March 15 for graduate students enteri spring semester. A program of studies may be revised, when necessary taining the approval of the departmental adviser and the Dean. The must be filed in the Graduate School Office.

CONTINUOUS REGISTRATION

All students must maintain continuous registration while working towa gree, except during the summer session. If continuous registration is n tained, the student is dropped from the degree program unless leave of is granted by the Graduate School. A Master's degree candidate who h pleted his course work and has already registered for the thesis, must continuous registration, if more time is needed to complete the thesis. ing the continuous registration fee, which is equivalent to one semeste

E OF ABSENCE

tudent is temporarily unable to continue his program of studies, he may st leave of absence for a specific period of time, not to exceed one cal- year. An exception is made for students granted Military Leave. A stu- who is called to active duty (or who enlists) may be granted Military e (see page 49) for the duration of his period of military duty upon ntation to the Graduate School of a copy of his orders and a request for leave. When the period of leave has expired, it is the student's respon- y to notify the Graduate School at least two months in advance of a given ration period of his intention to reregister. If he fails to reregister, his dacy will be terminated.

HDRAWAL

luate students who intend to withdraw from the Graduate School should rm the School in writing. The last day for *complete* withdrawal without emic penalty is at the end of the eighth week of classes.

DUATION REQUIREMENTS

students must file an "Application for Graduation" form and pay the re- ed graduation fee at the time of registration for the last semester or sum- session of the final year in which they intend to graduate. The student must registered in the Graduate School during the semester he plans to graduate. ster's and doctoral candidates may graduate in May, February, or Septem- A student who has completed the requirements for a degree but has not been awarded the degree will be issued a letter to this effect upon request.

DEGREES

ted below are the degree programs of the Graduate School of Arts and Sci- es and the specific degrees offered, by field. The programs are directed by departments concerned. Degree programs which bridge two or more de- rtments are directed by committees composed of members of the depart- nts concerned. For further information write to the Dean or the chairman the appropriate department.

The degrees of Master of Arts in Special Studies and Master of Science in ecial Studies are designed for students who do not wish to concentrate in a ecific field such as those listed below, but instead are interested in inter- sciplinary programs. It is possible to group several of these fields together make an interdisciplinary program; the program of studies is determined by e student in consultation with the Deans of the Graduate School. The student ay choose courses from those fields that he feels are pertinent to his academic al; however, he cannot have more than one-third of the courses from any ne department. Once a student has selected the group of courses that he elieves fulfills his needs, the program is judged on its academic merit by the ean. The student must then obtain permission to take the courses from the ppropriate departments.

GRADUATE FIELDS

The graduate course work offered in support of the degrees lis
shown by department in this CATALOGUE.

Subject	Deg
I. Humanities	
American Civilization	
American Literature	
Art:	
Ceramics	M.
Design	
Graphics	
Painting	
Photography	
Sculpture	
Art History and Theory	
Classical Archeology, Classics, and History	M
Dramatic Art	M
English Literature	M.I
French Language and Literature	M
Germanic Languages and Literatures	M
Museology	M
Music:	M
Applied Music	Mus
Conducting	
Music Composition	
Music Theory	
Musicology	
Philosophy	M.
Religion	M.
Religion and Medical Care	M.
Religious Education	M.
Russian Language and Literature	M.
Spanish American Literature	M.
Spanish Language and Literature	M.
II. Social Sciences	
Anthropology	
Economics	M.A
Geography	M.A
History	M.A
*International Relations	M.A
Political Science	
Sociology	M.A
	M.A
III. Physical and Mathematical Sciences	
Applied Mathematics	
Applied Statistics	M.A., M.S.
Chemistry	M.S.
Forensic Science	M.S.
Geochemistry	M.S. in Forens.S.
	M.S.

* The School of Public and International Affairs offers a Master of Arts field in Internationa

Subject	Degrees Offered		
Geology	M.A., M.S.		Ph.D.
Mathematical Statistics	M.A.		Ph.D.
Mathematics	M.S. for Teachers, M.A.		Ph.D.
Physics	M.A.		Ph.D.
Biomedical and Related Sciences			
Anatomy		M.S.	Ph.D.
Biochemistry		M.S.	Ph.D.
Biological Sciences		M.S.	Ph.D.
Biophysics			Ph.D.
Genetics		M.S.	Ph.D.
Human Ecology			Ph.D.
Microbiology		M.S.	Ph.D.
Mycology		M.S.	
Pathology		M.S.	Ph.D.
Pharmacology		M.S.	Ph.D.
Physiology		M.S.	Ph.D.
Psychology		M.A.	Ph.D.
Speech Pathology and Audiology		M.A.	

BINED MASTER OF SCIENCE AND DOCTOR OF MEDICINE DEGREES

nts interested in the combined degrees of Master of Science and Doctor edicine must meet the requirements for admission of the Graduate School rts and Sciences and the School of Medicine.

he Master of Science program consists of a minimum of 30 semester s of credit and the fulfilling of the tool requirement (see page 99). A imum of 12 semester hours of credit for graduate-level courses *completed part of the Doctor of Medicine degree curriculum* (and not already ap- toward the Bachelor's degree) will be allowed in fulfillment of the re- ements of the Master of Science degree. The remaining 18 semester hours work, which in most programs includes a thesis, must be work in the c medical sciences normally required for a Master of Science degree in the duate School of Arts and Sciences.

AL PROGRAM FOR THE DOCTOR OF MEDICINE AND CTOR OF PHILOSOPHY DEGREES

dual program is available to qualified students who seek both the Doctor of dicine and Doctor of Philosophy degrees. The requirements which must be filled for both degrees are identical to those currently and separately estab- ed in the School of Medicine and the Graduate School of Arts and Sciences. A student working toward these degrees may apply a maximum of 24 nester hours of approved course work in the School of Medicine toward the nimum of 48 hours of course work required to qualify for the General or mulative Examination for doctoral candidacy. This course work is normally en during the semesters that alternate with his medical program and in the rs following the award of his M.D. degree. The student's research for the

iology, Botany, and Zoology.

dissertation may begin concurrently with the final 24 semeste graduate course work leading to the General or Cumulative Exam estimated time for the completion of this dual program is six years.

In order to enter the dual degree program, a prospective stude apply for and gain admission to both the Graduate School of Arts and the School of Medicine separately through established proce admission to both schools, he may then apply for affiliation with gree program. Work toward the Doctor of Philosophy degree is under the jurisdiction of a *departmental* Doctoral Committee.

REQUIREMENTS FOR THE DEGREES

THE MASTER'S PROGRAMS

Most of the requirements listed below are applicable to candidates grees of Master of Arts, Master of Arts in Special Studies, Mast Arts, Master of Music, Master of Science, Master of Science fo Master of Science in Forensic Science, and Master of Science in Spe

1. *General Requirements.*—For a Master's degree program thesis, a minimum of 30 semester hours of approved graduate work 6 semester hours of thesis research, is required. For a Master's gram which does *not* include a thesis, the number of semester hours graduate course work is determined by the department, and norma of from 30 to 36 semester hours. The program without the thesis is dividual student option and is not available in every department. D can and often do set requirements above the minimum required by ate School. The program of study leading to the degree of Master Special Studies or Master of Science in Special Studies consists of 3 hours of approved graduate course work and does not require a

Work taken to make up deficiencies is never counted as part of t ments leading to a Master's degree. Upon approval, up to one-half quired graduate work may be taken in courses offered by the othe institutions of the Consortium of Universities of the Washington M Area, Inc., or by another degree-granting division of this University is transferred from another institution (see "Transfer of Credit" b number of semester hours which may be taken at an affiliated C institution is reduced by the number of hours accepted as transfe

It is expected that a Master's candidate will complete degree req within 3 years. Extensions beyond this 3-year period require appr written request.

2. *Academic Work Load.*—Full-time students register for 9 to 12 hours each semester; part-time students register for a minimum of 6 hours each semester. These requirements do not apply when a st fewer than 9 semester hours (full-time) or 6 semester hours (part- maining to complete his program. No more than 15 semester hours taken during any one semester.

3. *Transfer of Credit.*—A maximum of one-quarter of the semes of graduate course work required for a degree may be approved for t the Graduate School from the Division of University Students, anothe granting division of this University, or another accredited college or

the following conditions: the course work must have been taken prior mission to the Graduate School, it must be approved as part of the stu- program of studies, it must not have been applied to the completion of rements for another degree, it must be graduate-level course work, it must been taken within the past two years, and the student must have received de of *B* or better. This action must be approved on a "Request Form" e departmental adviser and the Dean. A transcript of the course work be on file before the request can be considered.

Tool Requirement.—Except for candidates for the degrees of Master of in Special Studies, Master of Music, Master of Science in Forensic ce, Master of Science in Special Studies, and Master of Science for hers, and candidates in the field of Dramatic Art for the degree of Master ne Arts, Master's candidates normally must complete successfully a tool rement in a foreign language, mathematics, statistics, or computer pro- ming. In place of a tool requirement, candidates for the degree of Master ne Arts in the fields of Ceramics, Design, Graphics, Painting, Photography, ulpture will complete a methods course selected by the Department of Art. e tool requirement examination should be passed prior to the beginning e third semester of graduate work; students who have not fulfilled this rement must register for the appropriate course at the beginning of the semester. Courses taken to satisfy the tool requirement cannot be counted e semester-hour requirement for the Master's degree. No Master's candi- may attempt a tool examination more than three times. A tool requirement ed at another university cannot be used to fulfill the requirement at this ersity.

ith the approval of the department directing the student's program of study, ol requirement may be selected from the following options:

) Passing a foreign language reading examination (a student may register he appropriate reading course for nonmajors or make arrangements with ppropriate department to take the examination on the scheduled dates). A ent majoring in a foreign language may not select that language to satisfy requirement; a student whose native language is not English may elect lish as the tool (students choosing English should contact the English artment).

) Mathematics, statistics, or computer programming—a student may either plete one of the following courses with a grade of *B* or better, or pass a ial examination, administered by the appropriate department, at the level he final examination: Epid 230; Math 31; Stat 49, 117, 118, 121, 197. courses represent the minimum requirement; some departments may require gher level of proficiency.

The Thesis.—The main purpose of a Master's thesis is to demonstrate student's ability to make independent use of the information and training uired through his other disciplines and to furnish objective evidence of his tructive powers in his chosen field. The student registers for 6 semester rs of thesis research and must complete the thesis no later than three calen- years after his initial registration. The student must maintain continuous stration during the period required to complete the thesis. Registration for is research entitles the student to the advice and direction of the member of faculty under whom the thesis is to be written. The thesis subject must be roved by the professor who will be directing the thesis. The thesis, in its l form with one copy and a certificate of approval signed by the thesis

director and at least one departmental reader, must be presented
no later than the date announced in the University Calendar. All
meet the form, style, and other requirements set forth in a pamph
tion Concerning Theses and Dissertations, available in the Office

6. *Master's Comprehensive Examination.*—Most Master's degre
must pass a Master's Comprehensive Examination in the major
aminations are held on dates fixed by the departments, so that re
filed in the Graduate School Office no later than the day before
meets to approve the list of graduates (approximately two w
graduation).

A student who fails to pass the Master's Comprehensive Exami
in exceptional circumstances, and with the approval of the departm
Dean, repeat the Examination at the next scheduled Examination
fails a second time, no further opportunity to take the Examination

THE DOCTOR OF PHILOSOPHY PROGRAM

The minimum requirements for the doctoral program are as follows:

1. *General Requirements.*—The program leading to the degree o
Philosophy requires completion of a minimum of 72 semester h
proved graduate work for entering students whose highest earned
baccalaureate. A minimum of 48 of these hours must be taken in
for the General Examination. Entering students whose highest ea
is a Master's degree are required to register for a minimum of
hours of approved graduate work, no fewer than 24 of which mu
in preparation for the General Examination. While completing the
portion of the program, the student must register for 12 to 24 sem
of *Dissertation Research*, depending on the number of hours com
to the General Examination. The exact number of semester hou
for any part of the total program is assigned by each departmen
exceed the minimum required by the Graduate School.

2. *Academic Work Load.*—Full-time students register for 9 to
hours each semester; part-time students register for a minimum of
hours each semester. These requirements do not apply when a
fewer than 9 semester hours (full-time) or 6 semester hours (pa
maining to complete his program.

3. *Transfer of Credit.*—Entering students who do not hold a M
gree may request transfer of up to 24 semester hours of credit tow
toral degree for acceptable graduate work taken at the Master's d
at George Washington University or another accredited college or

4. *Tool Requirements.*—As early as possible, and *before* comple
General Examination, the tool requirements specified in the progra
must be completed. The following rules apply to students permitte
(a) or (c) below: students entering the Graduate School with a
degree must satisfy the first tool requirement before completion of
hours of course work; students entering with a Master's degree must
first tool requirement no later than the second semester of registr
Doctor of Philosophy student. Courses taken to fulfill the tool r
are not counted in the semester-hour requirement for the Doctor of
degree program. The tool options are as follows:

(a) two foreign language reading examinations;

high-level proficiency in one foreign language;

one foreign language reading examination and the completion of one of llowing courses with a grade of *B* or higher: Epid 230; Math 31; Stat 49, 18, 121, 197.

doctoral student whose native language is not English may not elect his language to meet a foreign language examination requirement. With the val of his department, he may elect English to fulfill language require- in any of the options listed above except (b). The student who is given val to take a language examination in English should make arrangements the Department of English.

doctoral student may omit a tool preparation course at George Washing- niversity if he has had a similar course at another college or university. ever, his proficiency in that tool must be validated by an examination at niversity.

rther details for meeting the various tool requirements are stated in the uate School's Student Handbook.

The General Examination.—Each student is required to complete the ral Examination no later than the semester following the completion of e requirements. The General Examination is composed of a written ex- ation 5 to 6 hours in length in each of the areas of study comprising the nt's total program; the time permitted between each examination is deter- d by the administering department. Some departments permit one or two of study to be "written off"; that is, a special, shorter examination is after a year of course work in the area. A cumulative examination sys- s in effect in the fields of Chemistry and Physiology. Students in these should consult the appropriate department for information about this m.

The Degree of Master of Philosophy.—Upon departmental recommenda- the degree of Master of Philosophy may be awarded to students who have essfully completed all requirements for the Doctor of Philosophy degree and including the General Examination. Not all departments recommend nts for this degree.

The Dissertation and Final Examination.—A dissertation is required of doctoral candidate as evidence of his ability to perform scholarly research interpret its results. The candidate normally enrolls for *Dissertation Re- ch* upon completion of the General Examination; however, he may register p to one-half of the required number of semester hours of *Dissertation arch* during the time the General Examination is being completed. After required number of hours of *Dissertation Research* has been taken, if more is needed to complete the dissertation, the student must maintain con- us registration (see page 49) each semester until the dissertation is fin- d and the Final Examination is passed. If the dissertation is not completed in 5 years after the date the General Examination is completed, the stu- may be required to retake the General Examination.

o later than the date specified in the University Calendar, the candidate submit to the Dean the original and one copy of the dissertation and an tract for inclusion in the Announcement of the Final Examination and for oduction by University Microfilms, Inc.

When the dissertation has been approved by the Director and two members the Doctoral Program Committee and filed with the Dean, the candidate es the Final Examination, an oral examination which is open to the public.

A committee of examiners (composed of Graduate School Facu
appropriate, outside scholars) conducts the Examination. If
passes, he is recommended by the Graduate School for the deg
of Philosophy.

Detailed information regarding regulations for the form and re
the dissertation is available in the Office of the Dean. The succes
for the doctorate is required, before receiving his degree, to pay
the expense of printing the Announcement of the Final Examina
the basic service rendered by University Microfilms, Inc.

POSTDOCTORAL STUDY

George Washington University doctoral graduates may continue
the University without payment of tuition, and enjoy all Univ
privileges. Such graduates are required to pay the usual "contin
tion" fee and a University Center fee of $3.50 for each semester h
work in order to establish their active membership in the Univer
of laboratory space and equipment is contingent upon availability,
of all laboratory or special library material is paid by the grad
arrangements for such privileges must be made with the Dean w
semester in which the graduate wishes to register. Postdoctoral
under this privilege may not be applied toward any degree offered
versity.

FELLOWSHIPS AND FINANCIAL AID

A limited number of graduate teaching fellowships are available
partments of instruction to students registered in the Graduate Sc
and Sciences. In addition, the University participates in these gove
grams: National Science Foundation Traineeships and National D
cation Act (Titles IV and VI) Fellowships. Other kinds of sp
University awards are available, but limited.

Students applying for admission who also wish to apply for
should submit the fellowship application and the application for a
February 15; the necessary transcripts, Graduate Record Examina
and letters of recommendation should also be on file by this da
currently enrolled in the Graduate School should submit only th
application and have current letters of recommendation on file by F

Forms are available at the Office of the Graduate School of A
ences. Filing the fellowship application entitles the student to consi
all the awards available in his department.

Students who wish to apply for loans should indicate their inte
on the application for admission. Information concerning loans i
in a booklet, *Student Financial Aid*, available from the Universit
Financial Aid Office.

COOPERATIVE PROGRAMS

merican Studies Program at George Washington University is affiliated
e American Studies Program of the Smithsonian Institution. This ar-
ent offers the student in the field of American Civilization an oppor-
o take advantage of the Washington environment. Members of the staffs
Smithsonian's American Studies Program, Museum of History and Tech-
, National Portrait Gallery, National Gallery of Art, and National Gallery
e Arts offer seminars and tutorial instruction in fields which provide the
with an unusual opportunity to develop new dimensions in the discipline
erican Civilization. This program of study is open to students working
the degrees of Master of Arts and Doctor of Philosophy, and is intended
epare them for research, teaching, and museum-related careers.
Department of Art at George Washington University and the Smithson-
titution offer a joint graduate program of study and research in Museum
leading to the degree of Master of Arts in the field of Museology.
rogram of study leading to the degree of Doctor of Philosophy in
can Civilization with emphasis on library research and collections is
jointly by George Washington University and the Library of Congress.
oordinator of the Library Program and his staff offer an orientation
r and other courses and supervise students in reading and research
work on such library problems as indexing, cataloguing, and bibli-
hy.

further information concerning these programs contact one of the follow-
fices at George Washington University: the Graduate School of Arts and
es for those who are interested in any of the fields listed above, the
rtment of Art for those interested in the Museology field, the American
es Program for those interested in the American Civilization field.
orge Washington University, in cooperation with three other regional
rsities and the Folger Shakespeare Library, has established the Folger
ute for Renaissance and 18th Century Studies as a cooperative venture
duate studies in the humanities.
minars (limited to twelve students each) are offered each semester under
rection of outstanding American and foreign scholars. The Folger Library
physical center for the Institute. All participants enrolled in the seminars
ranted access to the collections of rare books, manuscripts, and reference
rials of the Library. There are also opportunities for participants to estab-
personal relationships with the fellows and readers at the Library, in the
erance of their research. All registered students are eligible to apply for
ssion to one or more of the seminars, although priority in enrollment
be accorded to graduate students working on dissertations and to post-
oral scholars from the sponsoring institutions.
urther information, including a listing of seminar topics, is available in the
e of the Graduate School of Arts and Sciences of George Washington
versity or at the Folger Shakespeare Library.
he University and the National Bureau of Standards have entered into a
perative agreement to further educational opportunity at both the Univer-
and the Bureau. This arrangement holds great promise for graduate study
research, particularly in the physical sciences.



SCHOOL OF EDUCATION

Dean Rodney Tillman
Assistant Dean R.E. Baker

FACULTY*

ssors J.G. Allee, Jr., G.L. Angel, R.E. Baker, Perry Botwin, J.L. Breen, rcella Brenner, W.T. Carroll, Mary Ellen Coleman, Bertice Cornish, V.J. Angelis, H.G. Detwiler, L.H. Elliott, R.G. Hanken, Donald Hawkins (*Re-rch*), A.D. Kirsch, Anthony Marinaccio, Leonard Nadler, Martha Rashid, rol St. Cyr, Daniel Sinick, Loretta Stallings, Rodney Tillman

ciate Professors J.G. Boswell, R.S. Cottrell, Jr., R.J. Frankie, Lyndale orge, Eva Johnson, Virginia Kirkbride, Margaret McIntyre, Dorothy pore, Jeanne Snodgrass, C.E. Vontress, Lawrence Winkler, Maida Withers

tant Professors Gloria Horrworth, Rita Ives, Nancy Johnson, Donald nkowski, Honey Nashman, S.R. Paratore, Ruth Peterson, R.W. Prouty, W. Smith, M.G. Van Dyke, G.D. Wiggs

uctors Miriam Barteaux, Mary Campbell, Florence Nikkel, Nancy Roche

MMITTEES†

DEAN'S COUNCIL‡

2: R.J. Frankie, Loretta Stallings
3: Bertice Cornish, Donald Linkowski

MMITTEE ON ADVANCED GRADUATE STUDIES‡

. Baker (*Chairman*), G.L. Angel, J.G. Boswell, Perry Botwin, W.T. Carroll, tice Cornish, R.S. Cottrell, Jr., H.G. Detwiler, R.J. Frankie, Virginia Kirk-le, A.D. Kirsch, Donald Linkowski, Anthony Marinaccio, Leonard Nadler, rtha Rashid, Carol St. Cyr, Daniel Sinick, C.E. Vontress, Lawrence Winkler

MMITTEE ON ADMISSION AND ADVANCED STANDING§

dney Tillman (*Chairman*), Perry Botwin, J.L. Breen, H.G. Detwiler, J.Y. th

MMITTEE ON SCHOLARSHIP

dney Tillman (*Chairman*), Perry Botwin, J.L. Breen, H.G. Detwiler

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he President of the University, the Vice President for Academic Affairs, the Registrar of the versity, the Director of Admissions of the University, and the Director of Libraries of the Uni-ty are ex officio members of the Faculty of the School of Education.
e Dean and the Assistant Dean of the School of Education are ex officio members of all com-ees.
ected by the Faculty.
ppointed by the Dean.

INTRODUCTION

It is the purpose of the School of Education to prepare teachers, cou and administrators for leadership responsibilities, and to offer exp teachers opportunities to extend their education. The School includes partments of Education; Physical Education, Health, and Recreatio Special Education. It offers both graduate and undergraduate work. Ot partments of the University provide general education and subject courses needed for a well-balanced program of teacher education.

Individually planned programs are provided for liberal arts and o lected graduates who wish to prepare for teaching. The School also a wide range of courses to provisional teachers who wish to qualify fo ing certificates and teachers who wish to renew licenses. Degree prog adult education, higher education, human resource development, rehab counseling, and student personnel work in higher education are offere

Laboratory and clinical facilities are provided by the University Center and Speech and Hearing Clinic. In cooperation with public and schools and a wide variety of social agencies, ample opportunity for perience is provided.

In addition to a full schedule of weekday courses during the acade classes are offered in the evening, on Saturday, and during the summ

HISTORICAL DEVELOPMENT

The University began offering professional courses for teachers in 190 in 1907 it established a Division of Education. In 1909, the Division cation became the Teachers College, which in its early years was co largely with teacher preparation on the undergraduate level.

In 1928, the Teachers College became the School of Education, and provision was made for advanced study. Graduate enrollment has ste creased, and today the School has a considerably larger number of g than undergraduate students.

EDUCATION FOR TEACHERS

Programs are planned to provide a broad general education, adequate of the teaching-field content, and professional competence. The rela phasis placed on each of these depends on the student's teaching-le For example, elementary school teachers, since they teach all subject preparation of greater breadth and less specialization than secondary teachers.

Adequate preparation for teaching requires an acceptable minimum years of full-time study. Five years terminating in a Master of Arts i tion degree are needed for superior preparation which will comman salaries and opportunities for promotion. During the first two years, the is registered in the lower division of Columbian College of Arts and the liberal arts college of the University, where he acquires the backg general education so essential to success as a teacher. Here he is as special adviser from the School of Education to assist in planning his p

REGULATIONS

ulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES *are d on pages 23-34; other University regulations, on pages 45-53.*

DEMIC WORK LOAD

ERGRADUATE

een to 17 semester hours of credit constitute a normal program. A student a quality-point index of 3.00 or higher may, with the permission of the n, enroll for 18 or 19 hours. No student may enroll for more than 19, pt by permission of the Committee on Scholarship.

student employed 15 hours or less a week may carry a normal program ollege work.

student employed from 16 to 25 hours a week may enroll for 12 or 13 rs. With a quality-point index of 3.00 or higher he may, with special per- ion of the Dean*, enroll for 14 to 16 hours.

student employed from 26 to 34 hours a week may enroll for 9 or 10 rs. With a quality-point index of 3.00 or higher he may, with special per- ion of the Dean*, enroll for 11 to 13 hours.

student employed 35 hours or more a week may enroll for 6 or 7 hours. n a quality-point index of 3.00 or higher he may, with special permission he Dean*, enroll for 9 or 10 hours.

student who increases his hours of employment after registration or at any during a semester must report immediately to the Dean so that his pro- n may be adjusted, if necessary.

DUATE

dents employed full-time may take a maximum of 6 semester hours.

The Bachelor's Degrees

SCHOOL OF EDUCATION OFFERS PROGRAMS leading to the degrees of Bache- of Arts in Education and Bachelor of Science in Physical Education.

he program of each student must be approved by a faculty adviser. Since n student's program is defined by his particular needs, it is important that student have a clear concept of his major interest in education, and also he be familiar with the teaching-certificate requirements of the locality in ch he expects to teach.

TRANCE REQUIREMENTS

Bachelor of Arts in Education and *Bachelor of Science in Physical Educa-*
.—The satisfactory completion of the appropriate first two-year curriculum Columbian College of Arts and Sciences (see pages 80-82), or the equivalent m another accredited educational institution with a quality-point index of

quest forms are available at the Office of the Dean. They should be filled out and returned to Dean at least two weeks prior to Registration.

at least 2.25 or the equivalent, is required. Applicants must, at an ac
interview, exhibit personality traits that give promise of success as a

REQUIREMENTS FOR THE DEGREES

To be recommended for a degree a student must satisfy the admissi
dence, scholarship, and curriculum requirements.

RESIDENCE

Candidates for the Bachelor's degrees must complete satisfactorily whil
School of Education a minimum of 30 semester hours, 9 of which, with
proval of the adviser, may be in off-campus courses of the College of
Studies.

For full details concerning continuous registration, see page 49.

SCHOLARSHIP

For the system of grading and of computing scholarship, see pages

In order to graduate, a student must have a quality-point index of
2.25.

Probation.—A student who fails to maintain a quality-point index of
2.00 is placed on probation. He remains on probation as long as his
below 2.00, or until his probation is removed by the Committee on
ship.

Suspension.—A student on probation who fails to raise his index
within the time specified may be suspended.

A student suspended for poor scholarship may, within ten days, ap
case to the Committee on Scholarship through the Dean. If the case
to be remediable and the student seems likely to improve his scholars
Committee may readmit him on probation. A student denied readmissi
again, after a lapse of a calendar year, petition the Committee thro
Dean for readmission. A student suspended twice will not be readmitte

CURRICULUM REQUIREMENTS

In all Bachelor's curricula at least 30 semester hours must consist of
numbered above 100.

CREDIT/NO CREDIT OPTION (See page 47)

BACHELOR OF ARTS IN EDUCATION

The objective of programs leading to the degree of Bachelor of Arts in
tion is to provide (1) general educational backgrounds; (2) function
mand of ideas, concepts, knowledge, and skills in one or more teachin
(3) mastery of basic professional information and skills adequate for th
ning teacher; and (4) development of attitudes needed for success in

The general educational backgrounds needed by prospective teachers
tained through precollege education, college courses, work experience
ship activities, student campus activities, and off-campus cultural oppor

ormally, from 63 to 66 semester hours of the total requirement are com-
d in Columbian College of Arts and Sciences of this University or in an
valent institution elsewhere (see "Education," pages 80-81). Since the
hing fields differ in content, scope, and complexity, some programs are
er than others.

ork experience, leadership activities, participation in student campus activi-
and *the utilization of off-campus cultural opportunities.*—As part of formal
se work and on their own initiative, students of the School of Education
expected to take full advantage of the many opportunities in the Washing-
area for developing leadership skills. Advisers are available to help students
these experiences.

IONAL TEACHER EXAMINATIONS

candidates for the degree of Bachelor of Arts in Education are required to
the National Teacher Examinations. Those expecting to graduate in May
ld take the Examinations the previous April; those expecting to graduate
February, in July or November. Students expecting to complete degree re-
ements during the Summer Sessions should take the Examinations in April
uly.

tudents receive individual reports of test scores and may avail themselves of
regular transcript services of the Educational Testing Service. Students
t request the Testing Service to send copies of test scores to the School of
cation.

tudents required to take the Examinations must register for them in the
ce of the Dean at least thirty days prior to the date of the Examination.
ails concerning time, place, registration, and fees may be obtained in the
ce of the Dean.

ACHING-FIELD PREPARATION

ching-field preparation depends upon the teaching position for which the
lent is preparing. Those planning to teach in elementary schools need a
ree of competency in several fields. Those preparing to teach in junior or
or high schools must demonstrate competency in a major teaching field. A
or teaching field is optional, but recommended. Ordinarily, students pre-
ng to teach in evening schools for adults are required to prove competency
nly one teaching field. The student should begin teaching-field preparation
le in the lower division of Columbian College.

Teaching-field requirements, developed in cooperation with appropriate de-
tments of the University, include satisfactory completion of prescribed aca-
mic courses in one or more fields, a satisfactory score on the special field
mination of the National Teacher Examinations*, and satisfactory comple-
of the prescribed special methods courses.

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ecial field examinations of the National Teacher Examinations are available in elementary educa-
early childhood education; biology and general science; English language and literature; industrial
mathematics; chemistry, physics, and general science; social studies; physical education; business
ation; music education; home economics; and art education.
udents preparing to teach history or geography take the special field examination in social studies.
udents preparing to teach in fields in which special field examinations are not available must
n a satisfactory score on a special field examination given by the instructor in the special methods
e involved.

Prescribed academic courses vary in number in accordance with t
and complexity of the teaching field and the license requirements of
ous states. Minimum academic course requirements for each major
field are listed on succeeding pages. Minor teaching-field requirem
somewhat less than those of a major field. Students preparing to teac
elementary level are advised to use electives to increase their mastery
tent in an academic field or an area of specialization.

The prescribed courses in special methods are concerned primar
methods of initiating, guiding, and evaluating learning experiences deal
the content of teaching fields. They attempt to bring to the student
suggestions drawn from the accumulated experience of successful
However, in addition, the courses review the teaching-field content
in use in schools, and examinations at the end of courses provide the
of competency in the teaching fields.

PRESCRIBED COURSES IN THE VARIOUS TEACHING FIELDS

Art

Art 31–32:	Survey of Western Art, or
Art 71–72:	Introduction to the Arts in America
Art:	To be selected from second-group Art History courses o any third-group Art History courses open to the under- graduate
Art:	To be selected from the following
*Art 21–22:	Design I: Basic
Art 23–24:	Fundamentals of Photography
Art 41–42:	Drawing I
Art 51–52:	Ceramics I
Art 57–58:	Graphics I
Art 65–66:	Painting I
Art 81–82:	Sculpture I
Art 123–24:	Design II: Individual Problems
Art 125–26:	Painting II
Art 127–28:	Painting III
Art 131–32:	Ceramics II
Art 143–44:	Serigraphy
Art 151–52:	Ceramics III
Art 153–54:	Graphics II
Art 157–58:	Graphics III
Art 163–64:	Design: Visual Communication
Art 165–66:	Design: Advanced Visual Communication
Art 175–76:	Design Projects
Art 179–80:	Sculpture II
Art 181–82:	Intermediate Photography
Art 189–90:	Sculpture III
	Total

* Art 21-22 or permission of Department Chairman is prerequisite to all other studio courses.

Biology*

		Semester Hours
B Sc 11–12:	Introductory Biology for Science Majors	8
B Sc 101–2:	Invertebrate Zoology, or	
B Sc 104:	Comparative Vertebrate Anatomy	6–4
B Sc 108:	Organic Evolution, or	
B Sc 127:	Genetics	3–4
B Sc 140:	General Ecology	4
B Sc 163:	Human Physiology, or	
B Sc 164:	Vertebrate Physiology	4
B Sc:	Advanced Botany courses as approved by the adviser	6
Chem 11–12:	General Chemistry	8
Phys 1:	General Physics	4
Phys 2:	Introduction to Modern Physics	4
	Total	45–48

Chemistry

Chem 11–12:	General Chemistry, or	
Chem 15–16:	Intensive General and Analytical Chemistry	8
†Chem 22:	Introductory Quantitative Analysis	4
Chem 51–52:	Organic Chemistry	6
Chem 53–54:	Organic Chemistry Laboratory	2
Chem 111:	Physical Chemistry	3
Chem 134:	Descriptive Inorganic Chemistry	2
Chem 191:	History of Chemistry	2
Math 6:	Plane Trigonometry	3
Math 30:	Precalculus	3
Math 31:	Calculus of One Variable	3
Phys 1:	General Physics	4
Phys 2:	Introduction to Modern Physics	4
	Total	40–44

Earth Science

B Sc 3:	Introductory Biology for Nonscience Majors	3
Chem 11–12:	General Chemistry	8
Geol 14:	Field Petrology	3
Geol 21–22:	Physical and Evolutionary Geology	6
Geol 101:	History of Geological Sciences	3
Geol 122:	Structural Geology	3
Geol 125:	Marine Geology	3
‡Math 3:	College Algebra	3
‡Math 6:	Plane Trigonometry	3
Phys 1:	General Physics	4
Other Courses:	To be selected from the following as approved by the adviser	6–8
Anth 186:	Physical Anthropology	

*Other courses recommended but not required—Chem 50, or 51-52 and 53-54; Math 31.
†Chem 22 required if Chem 11-12 is elected.
‡Additional mathematics is required for some advanced geology courses.

Geol 128:	Geomorphology
Geol 141:	Introductory Geochemistry
Geol 147:	Chemical Geology in the Earth and Ocean Sciences
Geol 151–52:	Invertebrate Paleontology
Geol 163:	Sedimentation

Total

Elementary Education

Art:	As approved by the adviser
Econ 1:	Principles of Economics
Geog 51:	Introduction to Geography, or
Geog 52:	World Regional Patterns
Hist 71–72:	Introduction to American History
Math 9, 10:	General Mathematics I, II
Music:	As approved by the adviser
PE:	As approved by the adviser
Science:	As approved by the adviser
Other Courses:	To be selected from the following as approved by th adviser
Anth 1–2:	Introductory Anthropology
Econ 2:	Principles of Economics
Geog 51:	Introduction to Geography
Geog 52:	World Regional Patterns
Hist 39–40:	European Civilization in Its World Context
P Sc 4 or 5, 6:	Introduction to Political Science
Soc 1:	Introductory Sociology
Soc 2:	American Social Problems

Total

English

Engl 1 or 1x:	English Composition: Language as Communication
Engl 2:	English Composition: Language and the Arts and Science
Engl 52:	Introduction to English Literature
Engl 71–72:	Introduction to American Literature
Engl 101:	Expository Writing
Engl 115:	Introduction to English Linguistics
Engl 127–28:	Shakespeare
Sp&D 11:	Voice and Diction
*Engl:	To be selected from the following as approved by th adviser
Engl 133–34:	The Romantic Movement
Engl 135–36:	Victorian Literature
Engl 137–38:	The 20th Century
Engl 153–54:	The English Novel
Engl 155–56:	The English Drama
Engl 161–62:	Studies in American Literature
Engl 163–64:	Major American Poets
Engl 165–66:	American Drama

* Not required for the minor teaching field.

		Semester Hours
Engl 167–68:	The American Novel	
Engl 171–72:	Major American Writers	
Engl 175–76:	Special Topics in American Literature	
Engl 177–78:	Contemporary American Literature	
	Total	39

French

Fren 9–10:	French Conversation and Composition, or	
Fren 12:	French Conversation and Composition (Intensive)	6
Fren 51–52:	Survey of French Literature, or	
Fren 91–92:	Analyse de texte	6
Fren 103:	Pronunciation and Intonation	3
Fren 108:	Cours avancé de grammaire	3
Fren 109–10:	Advanced French Conversation and Composition	6
French:	To be selected from the following	18
Fren 119–20:	French Literature of the Middle Ages and the Renaissance	
Fren 121–22:	17th Century French Literature	
Fren 123–24:	18th Century French Literature	
Fren 125–26:	19th Century French Literature	
Fren 127–28:	20th Century French Literature	
Fren 193:	Cours de style	
Other Courses:	Recommended from the following but not required	6
Art 109:	19th Century Art in Europe	
Art 110:	Contemporary Art	
Engl 115:	Introduction to English Linguistics	
Foreign Lang:	Other than French as approved	
Hist 141–42:	History of France	
Psyc 115:	Psychology of Language and Communication	
	Total	42–45

General Science*

B Sc 3–4:	Introductory Biology for Nonscience Majors	6
†Chem 11–12:	General Chemistry, or	
Chem 15–16:	Intensive General and Analytical Chemistry	8
†Chem 22:	Introductory Quantitative Analysis	4
Phys 1:	General Physics and	
Phys 2:	Introduction to Modern Physics, or	
Phys 9–10:	Introduction to Astronomy	6–8
‡Science:	Additional courses as approved by the adviser	10
Math:	To be selected from the following	9
Math 3:	College Algebra	
Math 6:	Plane Trigonometry	
Math 30:	Precalculus	
Math 31:	Calculus of One Variable	

* May not be chosen as a minor teaching field.
† If Chem 11-12 is elected, it must be followed by Chem 22. If Chem 15-16 is elected, Chem 22 is not required; however, Chem 50 is recommended following Chem 16.
‡ Eighteen semester hours in one science field are required for certification.

Math 32: Calculus of Several Variables
Math 33: Calculus of Vector Functions

Total

Geography

Geog 51: Introduction to Geography
Geog 52: World Regional Patterns
*Geog: To be selected from the following
Geog 103: Cartography and Graphics
Geog 104: Special Techniques in Cartography
Geog 125: Transportation Geography
Geog 126: Economic Geography
Geog 127: Population and Settlement
Geog 132: Resources and Environment
Geog 133: Geography of Poverty and Hunger
Geog 134: Location of Industry
Geog 140: Urban Geography
Geog 141: Urban Settlement
Geog 142: Urban Environments and Systems
Geog 144: Environmental Adaptation
Geog 145: Cultural Geography
Geog 146: Political Geography
Geog 161: Latin America

Total

German

Germ 9–10: German Conversation and Composition
Germ 51–52: Introduction to German Literature
Germ 179–80: Advanced Conversation and Composition
*German: Additional courses as approved by the adviser

Total

History

Hist 39–40: European Civilization in Its World Context, or
Hist 91–92: World Civilizations
Hist 71–72: Introduction to American History
Hist: Research Seminar (see adviser, Department of History)
Hist: Six semester hours in each of three of the following groups as approved by the adviser
*Hist: Additional semester hours from any one of the following groups as approved by the adviser

Total

* Not required for the minor teaching field.

GROUP 1: AMERICAN HISTORY

Hist 167: American Colonial History
Hist 169: The American Revolution
Hist 170: U.S. Early National History
Hist 171–72: U.S. Social History
Hist 173–74: The Negro in American History
Hist 175–76: U.S. Political History
Hist 177: The Ante-bellum South
Hist 179–80: U.S. Economic History
Hist 181–82: U.S. Diplomatic History
Hist 183: Oversea Expansion of the United States
Hist 185: Representative Americans

GROUP 2: EUROPEAN HISTORY

Hist 108: The Ancient Near East and Egypt to 600 A.D.
Hist 109: Early Aegean and Greek Civilizations to 200 B.C.
Hist 110: The Roman World to 455 A.D.
Hist 111–12: Medieval History
Hist 113: Early Middle Ages
Hist 121: The Renaissance in Western Europe
Hist 131–32: History of Germany
Hist 139–40: World History in the 20th Century
Hist 141–42: History of France
Hist 145–46: History of Russia
Hist 147: Economic History of Europe
Hist 149–50: European Diplomatic History
Hist 151–52: History of England and Great Britain
Hist 153: Tudor England
Hist 154: Stuart England
Hist 157: 20th Century European Diplomatic History
Hist 158: Modern Jewish History

GROUP 3: THE EASTERN WORLD

Hist 138: History of World Communism
Hist 145–46: History of Russia
Hist 187: History of Modern China
Hist 188: History of Chinese Communism
Hist 193: History of the Near East
Hist 194: History of the Modern Near East
Hist 195–96: History of East Asia

GROUP 4: LATIN AMERICAN HISTORY

Hist 162: History of Spain and Portugal
Hist 163–64: History of Latin America
Hist 165: History of Brazil
Hist 166: History of Mexico
P Sc 177: Governments and Politics in Latin America
P Sc 178: Latin America: Political Patterns and International Relations

Mathematics

Math 30:	Precalculus
Math 31:	Calculus of One Variable
Math 32:	Calculus of Several Variables
Math 33:	Calculus of Vector Functions
Math 34:	Introduction to Linear Algebra
Math 121:	Introduction to Abstract Algebra
Math 124:	Introduction to Matrix Theory
Math 135:	Projective Geometry
*Math:	Two additional second- or third-group courses in Mathematics approved by the adviser
Stat 97:	Introduction to Computer Programming
Stat 157–58:	Introduction to Mathematical Statistics
	Total

Music

Mus 5–6:	Harmony
Mus 103–4:	History of Music
Mus 131–32:	Advanced Theory
Applied Music:	Voice or major instrument
Applied Music:	Minor instruments
Ensemble:	Choral or Orchestral
Music Literature:	As approved by the adviser
Music Theory:	As approved by the adviser
	Total

Physics

Math 30:	Precalculus
Math 31:	Calculus of One Variable
Math 32:	Calculus of Several Variables
Math 33:	Calculus of Vector Functions
Phys 1:	General Physics
Phys 2:	Introduction to Modern Physics
Phys 31–32:	Introduction to Theoretical Physics
Phys 51–52:	Introduction to Experimental Physics
Phys:	To be selected from the following
Phys 161:	Mechanics I
Phys 163:	Physical and Quantum Optics
Phys 164:	Thermodynamics
Phys 165:	Electromagnetic Theory
Phys 167:	Principles of Quantum Physics
	Total

* Not required for the minor teaching field.

Russian

		Semester Hours
Slav 9–10:	Intermediate Russian Conversation and Composition	6
Slav 91–92:	Introduction to Russian Literature	6
Slav 125:	Russian Linguistic Structure	3
Slav 126:	Contrastive Russian-English Analysis	3
Slav 131:	18th Century Russian Literature	3
Slav 141–42:	Russian Romanticism and Realism, or	
Slav 151:	Russian Symbolism, and	
Slav 152:	Russian Literature after the Revolution	6
Slav 197:	Methodology of Teaching Russian	3
*Slav:	Additional courses from the following as approved by the adviser	9
Slav 101–2:	Readings in Modern Russian	
Slav 109–10:	Advanced Russian Conversation and Composition	
Slav 128:	Dostoevsky, the Man and the Artist	
Slav 143–44:	The Russian Novel	
Slav 146:	The Russian Short Story	
Slav 153:	Turgenev	
Slav 156:	Leo Tolstoy, His Life and Works	
Slav 157:	Nabokov	
Slav 158:	Solzhenitsyn	
Slav 161–62:	Russian Culture	
Slav 165:	Soviet Literature from the Revolution to World War II	
Slav 166:	Soviet Literature from World War II to the Present	
Slav 193–94:	The Other Slavs: Their Literature—in English	
	Total	39

Social Studies

Econ 1–2:	Principles of Economics	6
Hist 39–40:	European Civilization in Its World Context, or	
Hist 91–92:	World Civilizations	6
Hist 71–72:	Introduction to American History	6
P Sc 4 or 5, 6:	Introduction to Political Science	6
Other Courses:	To be selected from the following	6
Anth 1–2:	Introductory Anthropology	
Geog 51:	Introduction to Geography	
Geog 52:	World Regional Patterns	
Soc 1:	Introductory Sociology	
Soc 2:	American Social Problems	
*Other Courses:	Second-group courses, as approved by the adviser, from Anthropology, Economics, Geography, History, Political Science, and Sociology	12
	Total	42

Spanish

Span 9–10:	Spanish Conversation and Composition, or	
Span 12:	Spanish Conversation and Composition (Intensive)	6

* Not required for the minor teaching field.

Span 51–52:	Survey of Spanish Literature and Civilization
Span 91–92:	Explicación de textos
Span 109–10:	Advanced Spanish Conversation and Composition
Span:	Two full-year courses selected from second-group Spanish or Spanish American Literature courses
Other Courses:	Recommended from the following
Engl 115:	Introduction to English Linguistics
Foreign Lang:	Other than Spanish as approved
Hist 162:	History of Spain and Portugal
Hist 163–64:	History of Latin America
Hist 165:	History of Brazil
Hist 166:	History of Mexico
Psyc 115:	Psychology of Language and Communication
Span 193:	Curso de estilo
Span:	Second-group courses in Spanish and Spanish American Literature not previously elected
	Total

Special Education*

S Ed 101:	Seminar: Dimensions of the Complementary Teaching Role
S Ed 102:	Teaching the Child with Special Needs: Techniques and Methods
S Ed 103:	Teaching the Child with Special Needs: Creative Programming
S Ed 170:	Interpersonal/Intrapersonal Relationships for Teachers
S Ed 189:	Preprofessional Internship in Special Education I
S Ed 190:	Preprofessional Internship in Special Education II
S Ed 199:	Practicum in Teaching Special Education
	Total

Speech and Drama

Sp&D 1:	Communicative Speaking and Listening
Sp&D 11:	Voice and Diction
Sp&D 32:	Oral Interpretation of Literature
Sp&D 101:	Acoustic Phonetics
Sp&D 112:	Advanced Public Speaking
Sp&D 121:	Group Discussion and Conference Leadership
Sp&D 169:	Introduction to Creative Dramatics
Sp&D 171:	Bases of Speech and Hearing
Area of Specialization:	Selected from one of the following groups as approved by the adviser
	Total

* Minor teaching field only. S Ed 102, 103, 170, 189, and 190 must be taken prior to the semi

GROUP 1: SPEECH COMMUNICATION*

Sp&D 126: Argumentation and Debate
Sp&D 127–28: Advanced Debate Practice
Sp&D 133–34: Radio and TV Broadcasting
Sp&D 143: History and Criticism of European Public Address
Sp&D 144: History and Criticism of American Public Address

GROUP 2: DRAMA*

Sp&D 115–16: Acting
Sp&D 151: Stagecraft
Sp&D 152: Advanced Stagecraft
Sp&D 154: Play Directing
Sp&D 155–56: Play Production Practice
Sp&D 165–66: History of the Theatre

OFESSIONAL EDUCATION

ne basic professional information, skills, and attitudes needed by beginning achers are provided through a sequence of courses to be taken in the junior d senior years. Lectures and class discussions are closely coordinated with eld work. Instruction is differentiated to meet the needs of those preparing to ach on the various levels—elementary school, junior high school, senior high hool, and adult.

Professionnl Courses—Secondary

		Semester Hours
Educ 108:	Human Development, Learning, and Teaching	3
Educ 112:	Educational Measurement	3
Educ 123:	Society and the School	3
Educ 131:	Secondary School Principles and Methods	3
Educ 134:	Student Teaching in Secondary Schools	6–9
pecial Methods:	Three to six semester hours from the following courses	3–6
Educ 136:	Teaching English in Secondary Schools	
Educ 137:	Teaching Speech	
Educ 138:	Teaching Social Studies in Secondary Schools	
Educ 139:	Teaching Art in Secondary Schools	
Educ 140:	Teaching Mathematics in Secondary Schools	
Educ 142:	Teaching Music in Secondary Schools	
Educ 144:	Teaching Science in Secondary Schools	
Educ 146:	Teaching Foreign Languages	
	Total	21–27

Professional Courses—Elementary

Educ 108:	Human Development, Learning, and Teaching	3
Educ 111:	Elementary School Curriculum and Methods	15
Educ 112:	Educational Measurement	3

* Not required for the minor teaching field.

Educ 123:	Society and the School	
Educ 135:	Student Teaching in Elementary Schools	
	Total	

BACHELOR OF SCIENCE IN PHYSICAL EDUCA

The curriculum, which is designed to prepare students for teaching in el tary and secondary school programs of physical education, offers opportu for specialization in dance, elementary or secondary school physical educ

The student wishing to prepare to teach another subject in addition to cal education may use his elective hours to work toward a minor teaching Relevant work in Columbian College may be counted.

PREREQUISITE

For the first two years of the Bachelor of Science in Physical Educatio riculum, see Columbian College of Arts and Sciences, pages 81-82.

CURRICULUM

Specialization in Dance

Junior and Senior Years

Educ 108:	Human Development, Learning, and Teaching	
Educ 112:	Educational Measurement	
Educ 123:	Society and the School	
Educ 134:	Student Teaching in Secondary Schools	
PE 109–10:	Dance Composition	
PE 117:	Teaching Modern Dance	
PE 134:	Rhythmic Analysis through Creative Movement	
PE 135–36:	Survey of Dance History	
PE 141–42:	Dance Production	
PE 150:	Human Anatomy	
PE 151:	Kinesiology	
PE 164:	Physiology of Exercise	
PE:	Nine semester hours to be selected from the following	
PE 119:	Creative Dance for Children	
PE 120:	Repertory	
PE 129:	Introduction to Motor Learning	
PE 137:	Dance Notation	
PE 144:	Choreography	
Elective:		
	Total	

ecialization in Elementary School Physical Education

Junior Year

		Semester Hours
Educ 108:	Human Development, Learning, and Teaching	3
Educ 123:	Society and the School	3
PE 101:	Physical Education in the Elementary School	3
PE 102:	Movement Education	3
PE 113:	Field Experience: Practicum in Physical Education	3
PE 130:	Motor Performance in Childhood	3
PE 138:	Physical Education Curriculum and Administration	3
PE 150:	Human Anatomy	3
PE 151:	Kinesiology	3
Elective:		6
	Total	33

Senior Year

Educ 112:	Educational Measurement	3
Educ 135:	Student Teaching in Elementary Schools	9
PE 114:	Field Experience: Practicum in Physical Education	3
PE 129:	Introduction to Motor Learning	3
PE 164:	Physiology of Exercise	3
Elective:		6
	Total	27

pecialization in Secondary School Physical Education

Junior Year

Educ 108:	Human Development, Learning, and Teaching	3
Educ 123:	Society and the School	3
PE 111–12:	Sports Education Technique	6
PE 113:	Field Experience: Practicum in Physical Education	3
PE 138:	Physical Education Curriculum and Administration	3
PE 150:	Human Anatomy	3
PE 151:	Kinesiology	3
Elective:		9
	Total	33

Senior Year

Educ 112:	Educational Measurement	3
Educ 134:	Student Teaching in Secondary Schools	6–9
PE 114:	Field Experience: Practicum in Physical Education	3
PE 129:	Introduction to Motor Learning	3
PE 164:	Physiology of Exercise	3
Elective:		9
	Total	27–30

The Degree of Master of Arts in Teaching

THE SCHOOL OF EDUCATION OFFERS AN INTENSIVE fifth-year program
to prepare selected graduates of accredited liberal arts colleges for tea
elementary schools. Successful fulfillment of the program's requireme
vides the professional courses necessary for certification as an ele
teacher. Students may receive the degree of Master of Arts in Teac
completion of the program or receive credit for 15 semester hours of
work toward the degree of Master of Arts in Education.

For details, write to the Chairman of the Department of Education,
Program, School of Education, George Washington University, Was
D.C. 20006.

ADMISSION TO THE PROGRAM

To be admitted as a student-intern, an applicant must (1) have a Bachel
gree from an accredited liberal arts institution, including courses related
general education requirements for teacher certification; (2) show evid
interest in children and a sincere desire to teach; (3) submit three writte
ences attesting to quality of academic record and personality; (4) submit
on the Aptitude Test of the Graduate Record Examination or the Miller
gies Test; and (5) be interviewed by the University Selection Committee,
der arrangements specified by the Committee and approved by the Dean
School of Education.

PLAN OF STUDY

Beginning with a six-week summer session, the program includes a Sep
experience with full-time study in the fall semester. Course work dur
time is planned to help each student gain understanding of (1) the char
tics of elementary school children, (2) the subject-matter areas of the e
tary school curriculum, (3) basic dimensions of teaching methodology, (
relationship between educational theory and methods, (5) educational te
measurements, and (6) the role of the school in American society.

During the fall semester, students will be given full-time student teach
signments in a nearby public school. This part of the program will per
student to use, in an actual teaching situation, the educational theor
methods which he has been studying.

An internship during the spring semester in one of the cooperating
systems in the area may provide the student an opportunity to assume
sponsibilities of a beginning teacher, with the help and guidance of Un
and public school staff members. Seminar meetings will be scheduled
for discussion of common problems and for cooperatively planned work
dividual and group needs of interns. Each student plans, conducts, and
on an Action Research Project.

The Degree of Master of Arts in Education

PROGRAMS OF STUDY LEADING TO THE DEGREE of Master of Arts in Edu
are designed to enable prospective teachers and teachers of experience

ease their knowledge of professional and academic information and skills and epare for special types of educational service. They also provide opportuni- s for college graduates in other disciplines to acquire needed professional ucation, as well as study in the subjects which they are planning to teach.

From the various related departments of the University, the student and his viser select courses to give the student an adequate background in his chosen ld of service. Programs for teachers-in-service and experienced teachers plan- ng to re-enter the profession are differentiated from those for students without aching experience.

Master's programs are available in the following fields:

dult Education
ollege Student Development
urriculum
ance
arly Childhood Education
lementary Administration
lementary Education
uidance
igher Education
uman Resource Development
Physical Education (candidates may specialize in dance, driver safety education, elementary school physical education, or special education)
Reading
Rehabilitation Counseling
Secondary Administration
Secondary Education
Special Education (candidates may specialize in crisis/resource teaching, diagnostic-prescriptive teaching, or early childhood special education)
Supervision and Human Relations

For teachers interested in developing or strengthening their academic com- etence, the elementary and secondary education fields normally permit 15 o 18 semester hours of work in departments other than education. These rograms are designed to meet the needs of teachers-in-service who need addi- ional work in content to qualify for advanced certification or to improve their lassroom skills; and may also be helpful to previously trained teachers planning o re-enter the profession. The major emphasis is upon strengthening both the cademic and professional competencies of the teacher.

Additional information concerning these programs may be obtained by writing or telephoning the Office of the Dean.

IVE-YEAR PROGRAM

A candidate entering the School of Education after having completed the pre- rofessional "Education" curriculum in Columbian College of Arts and Sciences (or with equivalent preparation) may choose a three-year program leading to he degrees of Bachelor of Arts in Education and Master of Arts in Education o be conferred simultaneously. The first year of this combined program will e devoted to teaching-field preparation; the work of the second year will in- lude the degree of Bachelor of Arts in Education junior-year professional ourses and a maximum of 18 semester hours of graduate courses; that of the hird and final year, senior-year undergraduate professional courses and the emaining graduate courses needed for the Master's degree. Student teaching, o be elected in the third year, may not be taken for graduate credit. A quality- point index of at least 2.50 in undergraduate courses must be attained before eginning the work of the senior year, and the program must meet all the re- uirements for the degrees of Bachelor of Arts in Education and Master of Arts n Education.

ENTRANCE REQUIREMENTS

A Bachelor's degree from an accredited institution, an undergraduate
point index of 2.50 or above (C + average), demonstrated interest in t
and personality traits that give promise of better-than-average succe
teacher, are required.

Two years of successful teaching are required before admission to ca
in the fields of guidance and school administration.

ADMISSION TO CANDIDACY

Candidates whose undergraduate preparation does not include equiva
the basic requirements for the degree of Bachelor of Arts in Educatio
make up deficiencies and may be required to take designated tests.

ADVANCED STANDING

For the record, advanced standing is granted for approved courses t
other accredited institutions, but a minimum of 30 semester hours
completed at this University as a Master's candidate.

A maximum of 12 semester hours of advanced courses completed in th
versity in excess of the requirements for the Bachelor's degree may be c
toward the Master's degree if the work fits in with the student's plan
cialization and is approved in writing by the Dean before being unde

Advanced standing is not granted for work completed five or mor
before application for admission or readmission to Master's candidac

REQUIREMENTS FOR THE DEGREE

PLAN OF STUDY

The plan of study leading to the degree of Master of Arts in Education r
a minimum of 33 hours of graduate credit. The plan may, at the studen
tion, include a thesis carrying 6 hours of graduate credit. Whether or no
dent selects the thesis option, a minimum of 18 hours, including a co
educational research methods and procedures, must be from courses p
primarily for graduate students (third-group courses). A minimum of 12
not including the thesis or the research course, must be from courses offe
the School of Education.

Programs may include additional teaching-field preparation. In such
however, undergraduate and graduate courses combined must be at least
lent to the undergraduate requirements for the degree of Bachelor of
Education (see pages 108-20).

Programs are planned initially in conference with an admission adviser
Office of the School of Education and subsequently with a designated adv
the candidate's area of specialization. These programs are based on the ne
of the candidate, his previous background, and the certification requirem
the state and locality in which the candidate plans to teach.

All degree requirements must be completed within a period of six ye

RESIDENCE

A candidate for the Master's degree is required to complete satisfacto

ester hours in residence in the School. With the approval of the adviser, 9 the 30 hours may be off-campus courses in the College of General Studies.

IOLARSHIP

graduate work grades are indicated as *A*, Excellent; *B*, Good; *C*, Minimum s; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal; *CR*, Credit. Grades *A*, *C*, and *F* are counted in computing the quality-point index (see page 47). A quality-point index of 3.00 is required for graduation. Students who re- ve the grade of *C* in more than 6 semester hours are subject to suspension. dents who receive a grade of *F* must confer with the Dean of the School of ucation before enrollment for further work.

Whenever a grade has not been assigned, the symbol *I* (incomplete) or the mbol *W* (authorized withdrawal) will be recorded. The symbol *I* indicates t a satisfactory explanation has been given to the instructor for the student's lure to complete the required work of the course. An "incomplete" cannot made up after the lapse of one calendar year except by written permission of e Dean's Council. An incomplete which is not removed within one calendar ar is automatically changed to an *F*. An incomplete cannot be removed by registering for the course.

HE THESIS

he choice of the thesis subject must be approved in writing by the student's ad- ser and filed in the Office of the Dean. A statement of the School of Educa- on standards for the thesis and printed copies of detailed regulations regarding e form and reproduction of the thesis are available in the Office of the Dean. Payment of tuition for the thesis entitles the candidate, during the period of gistration, to the advice and direction of the member of the faculty under hom the thesis is to be written. In case a thesis is unfinished, an additional alendar year may be granted without further tuition payment. The student ust, however, maintain continuous registration (see page 49) during this pe- od. If the preparation of the thesis extends beyond the additional calendar ear, the student must register for the entire 6 hours of thesis again and pay ition as for a repeated course.

ASTER'S COMPREHENSIVE EXAMINATION

n addition to the course examinations, the candidate must pass a special three- our examination on his area of specialization. Candidates for the examination ust be registered for the semester it is to be taken, and must file a written ap- lication in the Office of the School of Education no later than thirty days prior o the date of the examination.

The Degree of Education Specialist

HE SCHOOL OF EDUCATION PROVIDES A PROGRAM of advanced study leading to he degree of Education Specialist for students with Master's degrees in Educa- ion who seek further professional preparation for specific objectives.

ENTRANCE REQUIREMENTS

The degree of Master of Arts in Education from this University (or the e lent), a satisfactory score on the Miller Analogies Test or the Graduate R Examination, and two years of successful pertinent experience, are req

ADMISSION TO CANDIDACY

Each applicant must be interviewed and recommended by a staff member School of Education or by a representative in the candidate's locality app by the Dean.

SCHOLARSHIP

Scholarship requirements for the degree of Education Specialist are the sa those for the degree of Master of Arts in Education (see page 125).

PROGRAMS OF STUDY AND DEGREE REQUIREMENTS

Individual programs are developed, through the faculty-adviser plan, to candidates' abilities, interests, needs, and career goals. A minimum semester hours beyond the requirements of the degree of Master of Education at this University is required. At least 21 hours of this work taken on campus at this University. A maximum of five calendar ye allowed for completion of the program.

At least 12 of the required 30 hours must be in appropriate graduate c in Education selected from the following areas: (1) foundations and c study, (2) background and general principles of the field of study, (3) a of specialization.

THE COMPREHENSIVE EXAMINATION

Successful completion of a six-hour written examination and/or a examination, at the option of the major field adviser, is required.

The Degree of Doctor of Education

THE SCHOOL OF EDUCATION OFFERS PROGRAMS of advanced study leading t degree of Doctor of Education. These programs, which are under the vision of the Committee on Advanced Graduate Studies, provide major fie study in administration and supervision, adult education, curriculum, eleme administration, elementary education, guidance and counseling, higher e tion, human resource development, secondary administration, secondary e tion, special education, supervision and human relations, and teacher educa Supporting fields are available in administrative specialties, college studen velopment, history of education, human growth and development, philos of education, and rehabilitation counseling. With the approval of the mittee on Advanced Graduate Studies and of the departments concerned or two supporting fields may be taken in other departments of the Univer All programs require study of interrelated areas of education and a doc dissertation in the major field of study.

MISSION

e applicant must have adequate preparation for advanced study, including duate work in fields prerequisite to his objective equivalent to that required the degree of Master of Arts in Education at this University, at least three rs of successful pertinent educational experience, acceptable personal quali-, and a capacity for creative scholarship and effective leadership.
The applicant first arranges for an interview with the Assistant Dean for ad-nced graduate studies to explore his needs in relation to the resources of the hool and to guide him in his application for doctoral study. The required nission procedures and standards will be explained at this time. Candidates eting the initial standards are admitted to precandidacy for the degree.

ECANDIDACY

the precandidacy period a minimum of 12 semester hours of course work the program, including requirements specified by the Committee on Ad-nced Graduate Studies, must be completed. Application for full candidacy l then be decided on the basis of the quality of scholarship in the pre-ndidacy period, the recommendations of instructors, a detailed plan for the ance of the program, and a qualifying examination.

AN OF STUDY

general, from two to three years of full-time study beyond the degree of aster of Arts in Education, or the equivalent in part-time study, are required. ograms are individually planned. It is estimated that, for the average student, e work required for the total program will be 66 semester hours, including ninimum of 12 semester hours of dissertation research.
Each program is divided into two parts. The first consists of preparation for mprehensive examinations in a major field of study and each of four support-g fields, and a tool-subject requirement. The second is composed of research vestigation, the writing of a dissertation, and the final oral examination.
Students who have completed the comprehensive examinations and who were t registered for doctoral study under the payment plan in effect prior to July 1967, must register for a minimum of 6 semester hours of Dissertation Re-arch (491) a semester until 12 hours have been completed, and a minimum 3 semester hours a semester thereafter until the satisfactory completion of e final examination.

OMPREHENSIVE EXAMINATIONS

hen the student is admitted to doctoral candidacy, he is assigned to a commit-e, each member of which is responsible for guiding him in his preparation for ne of the four required comprehensive examinations in supporting fields or the mprehensive major field examination. The candidate must arrange individual nferences with the committee members to determine the content of each field nd to receive guidance in his preparation for the examination.
The supporting field examinations, which are taken first, are six-hour written xaminations. A student must satisfy a tool requirement by the completion of duc 296. In addition, a student who plans a historical research investigation r his dissertation must complete an appropriate research seminar offered by ne Department of History. The student's Dissertation Committee may rec-

ommend other tool requirements. The tool requirement must be co
prior to the major field examination. The major field examination is a
twelve-hour examination, six hours on each of two successive days.

The candidate begins the second part of his program after the satis
completion of all supporting field examinations, the tool requirement,
major field examination.

THE DISSERTATION

A dissertation is required as evidence of ability to perform scholarly re
and to interpret and present its results.

During the first part of the program, the Dean appoints a Dissertation
mittee, consisting of a major adviser as Director, usually the major field
and two additional faculty members who serve as readers. The candidate
quired to submit a proposal for his dissertation to this Committee, which
mines its acceptability and recommends approval to the Committee
vanced Graduate Studies. The dissertation is completed under the direc
the Dissertation Committee.

No later than the date specified in the calendar, the candidate must sub
the Dean three complete copies of the dissertation and two copies of an
for inclusion in the announcement of the examination and for reproduct
University Microfilms, Inc. Printed copies of detailed regulations regard
form and reproduction of the dissertation, preparation of the abstract, an
ices offered by University Microfilms, Inc., are available in the Office
Dean. The successful candidate for the doctorate is required, before re
his degree, to pay a fee to cover the expense of printing the Announcem
the Final Examination, and for the basic service rendered by Un
Microfilms, Inc.

THE FINAL EXAMINATION

When the dissertation has been accepted, the Director recommends the
date to the Dean for the final oral examination, which must be passed
three weeks before the degree is to be conferred. The examination is op
the public and is conducted by a committee of the Faculty, appointed
Dean, supplemented by at least two leaders in the candidate's field of
from outside the University. Candidates who successfully pass the oral
nation are recommended for the degree by the Faculty of the School of
tion.

RESIDENCE AND CONTINUOUS STUDY

All the preparation for the degree, including examinations and work othe
courses and seminars, which is done under the direction of an adviser,
done in residence. The student must remain registered in the School of
tion, except when the Dean or the Committee on Advanced Graduate
has granted a leave of absence. Failure to register each semester of the
demic year may result in lapse of candidacy. Subsequent readmission is
to whatever new conditions and regulations have been established by the
mittee on Advanced Graduate Studies.

The supporting and major field examinations must be completed with
years of the date of admission, and the entire program must be completed

years, regardless of full-time or part-time study. All candidates in pro-
s for teachers and other professional school personnel are required to
d at least one academic year in continuous full-time study. For candidates
ther programs (adult education, higher education, and human resource
lopment), two alternative options for full-time study are available. In-
ation concerning these plans will be provided by the Assistant Dean for
anced Graduate Studies upon request by the candidate.

cial Programs and Services

CATION OF TEACHERS OF EXCEPTIONAL CHILDREN

SCHOOL OF EDUCATION offers a program for the education of teachers of
ptional children. Laboratory experiences are arranged in schools for handi-
ed children in the metropolitan area. Students are accepted at the junior-
enior-year undergraduate, Master's, Education Specialist, and Doctoral
s. By special permission, teachers, school administrators, and adequately
ared students from other schools and colleges of the University may elect
e courses.

quiries concerning the program and the availability of scholarships and
wships should be directed to Dr. Perry Botwin, Department of Special
cation, George Washington University, Washington, D.C. 20006.

DUATE PROGRAM IN REHABILITATION COUNSELING

School of Education offers a federally funded Master's degree program
the preparation of rehabilitation counselors. These professional personnel
st persons who are disabled or disadvantaged to assume a proper place in
ety. The two-year program combines fieldwork with course work in prepar-
students for immediate employment in an expanding field that yields high
anitarian and financial rewards. Both the profession and the program are
rdisciplinary, drawing upon such related areas as guidance, medicine, psy-
ogy, social work, sociology, and special education.

raineeships, including tuition and stipends, are available for full-time stu-
s. Information and applications are available from Dr. Daniel Sinick,
abilitation Counselor Education, School of Education, George Washington
versity, Washington, D.C. 20006.

RTIFICATION CURRICULA

School of Education provides individually planned programs for liberal arts
duates with appropriate degrees who wish to prepare for teaching. Those
ing certification, but not wishing to work for a degree, may enroll in a
ification program if they meet the admission, scholarship, and personality
irements of degree candidates. The School also provides a wide range of
rses of interest to teachers who wish to renew licenses.

ADING CENTER

e pages 54-55)

OFF-CAMPUS DEGREE PROGRAMS

The School of Education has academic jurisdiction over the off-campu
grams leading to the degree of Master of Arts in Education in the fi
elementary administration; elementary education; secondary adminis
secondary education; special education—crisis/resource teaching, diag
prescriptive teaching, early childhood special education; and supervisi
human relations.

These degree programs are administered by the College of General S
For details concerning the off-campus programs see the *College of G*
Studies Catalogue.



SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

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Associate Dean R.L. Holland
Assistant Dean Norma Loeser

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nstructors Patricia Cleary (*Research*), R.A. Oliver, Richard Switalski (*Research*)

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* The President of the University, the Vice President for Academic Affairs, the Registrar of the University, the Director of Admissions of the University, and the Director of Libraries of the University are ex officio members of the Faculty of the School of Government and Business Administration.

† The Dean of the School is an ex officio member of all committees.

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The School of Government and Business Administration Advis
operates as an advisory group on policy, finance, and communi
It consists of responsible members of the business and governmen
ties, and of the faculty, administrators, and students of the School.

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* The President of the University, the Chairman of the Board of Trustees, the Vice Academic Affairs, the Vice President for Development, and the Dean of the School of and Business Administration are ex officio members of the Council.

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ert P. Thome, *Comptroller, The Washington Post Company, Washington, .C.*

ert L. Tull, *Vice President, Security Storage Company, Washington, D.C.*

es Otis Wright (*University Trustee*), *Corporate Director, Sea Island, Ga.*

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ellyn A. Brown, Rory M. Carson, James W. Rodgers

INTRODUCTION

is school was organized as the School of Government in 1928. During the xt two decades, programs in business administration and public administra-n were added, and the emphasis gradually shifted from undergraduate to aduate study. The name was changed in 1960 to the School of Government, siness, and International Affairs to reflect more accurately the offerings of e School. A division of the School was effected in 1966, and two schools ere established—the School of Government and Business Administration, a imarily professionally-oriented school; and the School of Public and Interna-onal Affairs, a primarily policy-oriented school.

BJECTIVES

The principal objective of the School of Government and Business Administra-ion is to prepare its graduates for positions in the management of complex or-anizations in both business and government. The degree programs are de-igned to prepare students both for *entrance* into business and government and for *advancement* to high-level management positions.

Programs in the School include examination of administrative principles and quantitative approaches to decision-making common to both business and gov-ernment. These programs stress the points at which major policy decisions of either business or government must give consideration to related policy deci-ions of the other. Emphasis is placed on the fact that management education is not limited to organizational techniques but is, in the broadest sense, educa-tion for management responsibility.

It is the policy of the School to emphasize a broad fundamental education as the best preparation for positions carrying management or administrative responsibility.

Undergraduate programs concentrate the first two years in a broad liberal arts curriculum drawn from the social sciences, humanities, quantitative methods, and a limited number of courses in administration. Students in the junior and senior years expand their work to include (1) the functions of business enter-prise, (2) the economic and legal environment of business, (3) the implications of modern analytical techniques based on quantitative methods, (4) the study of organization theory and human relations, and (5) the practice of problem-solving techniques.

Graduate programs develop the elements common to all manage
tions regardless of the nature of the operation. Master's degree pro
based on study of the principles of management, human relations,
lem-solving plus an area of specialization. Specialized concentratio
fered in the various fields of Business Administration, Public Admi
Health Care Administration, and Urban and Regional Planning.

Responsive to the needs of the Washington community, the Schoo
lowed the policy of making many of its educational activities availa
campus centers in and around the metropolitan area of Washington.
campus work leads to a degree carrying a different designation; thus, t
lor of Business Administration degree on campus has a substantial eq
to the Bachelor of Science in Administration degree offered off campus
ties furnished by government or business organizations. The Master of
Administration, Master of Public Administration, Master of Urban and
Planning, and Master of Arts in Government degrees are offered on
while the Master of Science in Administration degree is the only gra
gree offered off campus. The off-campus programs have strong suppo
area and provide significant contact with the business and governm
munities.

SUMMARY

In order to provide students with a common body of knowledge of bu
governmental administration, programs include the equivalent of at
year of work comprising the following areas:

1. In the case of business enterprise, a background of the concepts, p
and institutions in marketing and distribution, production, and financi
tions; in the case of governmental administration, a background of c
processes, and institutions of planning, programming, budgeting, personn
tices, and policy formulation in government.
2. A background of the economic and legal environment of busin
government enterprise, along with consideration of the social and poli
fluences on business.
3. A basic understanding of the concepts and methods of accoun
budgeting, quantitative methods, and information systems.
4. A study of organization theory, interpersonal relationships, contr
motivation systems, and communications.
5. A study of administrative processes under conditions of uncerta
cluding the integration of analysis and policy determination at the over-a
agement level.

ACADEMIC STATUS

The School of Government and Business Administration has maintain
membership in the Middle Atlantic Association of Colleges of Business
istration since 1961. It joined the Council on Graduate Education for
Administration in 1966. By invitation, in 1968, the School became a
academic member of the American Association of Collegiate Schools o
ness Assembly. The programs in Public Accounting designed to prepa
dents for Certified Public Accountants examinations have been approved
state boards of New York and Maryland. The program in Hospital A

tion is accredited by the National Accrediting Commission on Graduate ducation for Hospital Administration.

REGULATIONS

egulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES *are ated on pages 23-34; other University regulations, on pages 45-53.*

TTENDANCE

student may not attend classes until registration is completed and fees due e paid. A student may be dropped from any course for undue absence.
The student is held responsible for all the work of the courses in which he is egistered, and all absences must be excused by the instructor in charge before rovision is made for him to make up the work missed.
A student suspended for any cause may not attend classes during the period f suspension.

WITHDRAWAL

Withdrawal from a course or from the University without academic penalty is ermitted during the first four weeks after registration for the fall or spring emester. Withdrawal after this period is permitted only in unusual circumtances, and requires certification by the instructors of courses for which the tudent is registered that he is doing passing work (see "Withdrawal," page 48).

NDEPENDENT STUDY PLAN

A student of *demonstrated capacity*, with a special interest in the subject matter of a course, may be permitted to undertake study under the personal direction of an instructor, in accordance with the rules of the appropriate department. Credit under this plan is limited to the specific course credits normally allowed when taken on a class basis.

The Bachelor of Business Administration Degree

THE SCHOOL OFFERS PROGRAMS leading to the degree of Bachelor of Business Administration in the fields of Accounting, Business Administration, and International Business.

ENTRANCE REQUIREMENTS

Good character and an academic background appropriate for the program of studies contemplated are required.
Requirements for admission to the freshman class are as follows:
1. An acceptable certificate of graduation from an accredited secondary

school, showing at least fifteen units* which must include four years of at least two years of one foreign language; two years of science, p with laboratory instruction; two years of social studies, one of which American history; and two years of college preparatory mathematics. of algebra, or the equivalent, is prerequisite to courses in chemistry tistics; and one unit in algebra and one unit in plane geometry, or the lent, are prerequisite to courses in mathematics and physics.

2. The principal's statement that the applicant is prepared to under lege work.

3. College Entrance Examination Board scores submitted on the S Aptitude Test and the English Composition Achievement Test.

It is recommended that the examinations be taken in December or Scores on tests taken in the junior year may be submitted. Arrangem tests are the responsibility of the applicant and should be made with t cational Testing Service, 20 Nassau Street, Princeton, N.J. 08540; Center Street, Berkeley, Calif. 94704, not less than one month before of the test. In applying for the test, the applicant should specify that the be sent to the Office of Admissions, George Washington University, W ton, D.C. 20006.

The College Entrance Examination Board tests are preferred; howev American College Testing battery scores will be accepted. The ap should request that these scores be sent to the Office of Admissions from the American College Testing Program, Iowa City, Iowa. It is mended that the applicant take the tests in October of the senior year.

The School of Government and Business Administration will consid adequacy of the qualifications of an applicant who, because of unusual stances, does not present all of the formal requirements stated abov School may prescribe appropriate scholastic-aptitude tests of the Univ

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Students transferring from other colleges and universities as juniors offer an acceptable broad-based liberal arts program, or equivalent. case will more than 64 semester hours of advanced standing be granted course work completed at a 2-year or junior college.

REQUIREMENTS FOR THE DEGREE

ACADEMIC WORK LOAD

A full-time student not on probation may not ordinarily take more than semester hours. A student employed more than 24 hours a week, who on probation, may not take more than 9 semester hours.

A full-time student whose quality-point index is 3.50 or higher may not more than 18 semester hours. A student employed more than 24 hours a whose index is 3.50 or higher, may take up to 12 semester hours.

A student who accepts employment after registration or at any time during semester must report immediately to the Dean, so that his program may adjusted if necessary.

Exception to these rules will require the approval of the Dean.

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* A unit represents a year's study in a secondary school subject, including in the aggregate than 120 sixty-minute periods, or the equivalent, of prepared classroom work.

SCHOLARSHIP

In order to graduate, a student must have the following: (1) a general quality-point index of at least 2.00 and (2) an index in his major of at least 2.50. The major includes the required courses and courses taken in the group options.

DEAN'S HONOR LIST

The names of students who achieve a quality-point index of 3.50 or higher are placed on the Dean's Honor List for that semester. Appearance on the list will be limited to (1) full-time students registered for a minimum of 12 semester hours and (2) part-time students registered for a minimum of 12 semester hours over a period of two consecutive semesters, which may include a summer term.

PROBATION

A student whose quality-point index falls below 2.00 after completing a minimum of 12 semester hours of study will be placed on probation. This probation extends over the period in which the student attempts 12 semester hours of work which may include remedial studies as prescribed.

SUSPENSION

A student whose quality-point index is 1.50 or below or whose index remains below 2.00 at the end of his probationary period may be suspended. A student suspended for poor scholarship may apply for readmission after the lapse of either the fall or spring semester. To be considered for readmission, he must pass prescribed tests and submit evidence to the Dean's Council that during his absence from the University he has so conducted himself as to indicate that he will profit by readmission. A student readmitted after suspension is on probation and must maintain a current quality-point index of at least 2.50 on each 12 semester hours of work undertaken until his cumulative index is 2.00. In no case will the probationary period after readmission exceed 24 hours of study. A student suspended twice for poor scholarship will not be readmitted.

RESIDENCE

A minimum of 30 semester hours, including at least 12 hours in the major field, must be completed while registered in the School of Government and Business Administration. This requirement applies to students transferring within the University as well as to students transferring from other institutions. Summer work may be counted toward the residence requirement, but in no case may the period of residence aggregate less than thirty weeks. Unless special permission is granted by the Dean to pursue work elsewhere, the work of the senior or final year must be completed in the School of Government and Business Administration.

USE OF CORRECT ENGLISH

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the Dean. The Dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition

fee is charged. The granting of a degree may be delayed for failure
up such deficiency in English to the satisfaction of the Dean.

CREDIT/NO CREDIT OPTION (see page 47)

CORRESPONDENCE AND HOME-STUDY COURSES

Credit for correspondence or home-study courses is not acceptable an
be applied toward a degree.

EARNING CREDIT OR WAIVING REQUIREMENTS BY EXAMINATI

A student may earn credit up to a maximum of 30 semester hours
curricular requirements by performing satisfactorily on the following

College-Level Examination Program (CLEP).—CLEP offers two
examinations. (1) CLEP Subject-Matter Examinations—offered in 27
areas. These tests measure achievement in the equivalent of specific colle
courses. (Duplicate credit of course—by passing the examination and by
the equivalent course—is not permissible.) (2) CLEP General Examina
offered in five areas: Mathematics; Social Sciences; Humanities; the
Sciences; and English Composition. (Credit—advanced standing—is n
for the General Test in English Composition.) To be eligible to take th
General Examinations, a student must have been out of secondary sch
three years or more.

Advanced Placement Tests.—See pages 24-25.

Achievement Tests.—See page 26.

Examinations for Waiving Curriculum Requirements.—A required
may be waived by the satisfactory passing of a waiver examination aut
and prescribed by the department or curriculum adviser concerned.
this examination does not entitle the student to any hours of credit tow
degree. Request to take the examination should be made to the cur
adviser and the required fee paid at the Office of the Cashier before t
set for the examination.

CURRICULUM REQUIREMENTS

One hundred and twenty-four semester hours of course work are requi
graduation. To be recommended by the Faculty for graduation, candida
required to complete, in addition to the appropriate freshman and soph
work, a minimum of 60 semester hours in the junior and senior years
from one of the three major field curricula offered by the School.

Curriculum for the First Two Years

Acct:	Acct 1–2
B Ad:	B Ad 51
Comp:	Engl 1 or 1x, 2
Lang, Lit, Art, Music, or Speech:	Art 31–32 or 71–72; Asia 3–4; Engl 51–52, 71–72, or 91–92; Fren 3–4 or 6, or 51–52; Germ 3–4 or 51–52; Ital 3–4 or 51–52; Mus 3 and 4; Slav 3–4, 5–6, or 91–92; Span 3–4 or 6, or 51–52; or Sp&D 1 and 11 (Accounting majors

		Semester Hours
	may postpone this requirement until the junior year if they wish to take Acct 121 and 191 in the sophomore year)	6
Math:	Math 30, 31	6
*PE:		4
Science:	B Sc 3–4 or 11–12; Chem 3–4 or 11–12; Geog 51 and 52; Geol 1–2; or Phys 1 and 2, or 9–10	6–8
Social Studies:	Econ 1–2	6
	Psyc 1, 8	6
	Anth 1–2, Hist 71–72, P Sc 4 and 6 or 5 and 6, or Soc 1 and 2	6
Stat:	Stat 51	3
†Elective:	Courses other than Accounting, Business Administration, or Economics	4–6
	Total	64

Accounting Major

Required—Junior and Senior Years

		Semester Hours
Acct 101:	Cost and Budgetary Control	3
‡Acct 121:	Intermediate Accounting	3
Acct 161:	Federal Income Taxation	3
Acct 171:	Auditing	3
Acct 181:	Accounting Systems	3
‡Acct 191:	Advanced Accounting	3
B Ad 101:	The Business Environment	3
B Ad 102:	Fundamentals of Management	3
B Ad 131:	Business Finance	3
B Ad 141:	Basic Marketing Management	3
B Ad 161:	Commercial Law: Contracts, Sales, Agency, Bailments	3
B Ad 181:	Manufacturing Production	3
B Ad 198:	Case Problems in Management	3
Econ 121:	Money and Banking	3
Mgt 118:	Introduction to Data Processing	3
Mgt 119:	Data Processing Programming	3
Stat:	Three semester hours selected from the following	3
Stat 111:	Business and Economic Statistics I	
Stat 155:	Introduction to Probability	
Stat 187:	Theory of Sampling	
Elective:	Three semester hours may be selected from Accounting or Business Administration	3
	Six semester hours selected from courses other than in Accounting, Business Administration, or Economics	6
	Total	60

* Freshmen and sophomores are required to take 4 semester hours of first-group Physical Education, Health, and Recreation courses unless they are registered for less than 9 semester hours or unless regular employment during the day makes it necessary to take all classes during the evening hours. Any other exemption will be granted only upon written petition approved by the Dean. Students exempted from these courses must substitute 4 semester hours of electives.

† Credit is not given for courses elected in Physical Education, Health, and Recreation.

‡ If Acct 121 and 191 are elected in the sophomore year, students replace this requirement with 6 semester hours of Art, Language, Literature, Music, or Speech (see pages 138-39).

NORMAL SCHEDULE FOR ACCOUNTING COURSES

Junior Year: Fall—Acct 101, 121 (if not elected in sophomore year)
Spring—Acct 191 (if not elected in sophomore year), 161 (if not ele
fall).
Senior Year: Fall—Acct 171; Spring—Acct 181.
Three semester hours of Accounting may be taken as an elective in eit
junior or senior year.

ACCOUNTING PRACTICE INTERNSHIP

An internship in accounting practice is open to Accounting majors dur
semester break of the senior year. Students will be paid a salary whil
ducting audits under senior supervision of participating C.P.A. firms.
internships with industry and government are available. The general r
ments are at least 15 semester hours of Accounting courses, including a
in auditing, with a 2.85 or higher average and an over-all grade average
or higher. For further information consult A.J. Mastro, Chairman of t
partment of Accounting, George Washington University.

Business Administration Major

The program in Business Administration is designed to provide the
foundation required for eventual top leadership in either governmental o
ness administration. It consists of the 36 semester hours of *required* cours
hours in one of the following group options; and 9 hours of electives, no
advanced courses in liberal arts subjects.

Required—Junior and Senior Years

Acct 193:	Business Budgeting
B Ad 101:	The Business Environment
B Ad 102:	Fundamentals of Management
B Ad 105:	Personnel Management
B Ad 131:	Business Finance
B Ad 141:	Basic Marketing Management
B Ad 161:	Commercial Law: Contracts, Sales, Agency, Bailments
B Ad 181:	Manufacturing Production
B Ad 198:	Case Problems in Management
Econ 121:	Money and Banking
Mgt 118:	Introduction to Data Processing
Psyc 144:	Personnel and Industrial Psychology
Group Option:	To be selected from one of the following groups
Elective:	To be selected in consultation with the adviser
	Total

GROUP OPTIONS

Seven areas of specialization are open to Business Administration major
15 hours taken in each of these options require the approval of the adviser
group option and the individual courses within the option should be selecte
the beginning of the junior year. The student should contact the Chairma
the Department of Business Administration for assignment of an adviser

GROUP I: AUTOMATIC DATA PROCESSING

The following courses provide the basic academic foundation for positions in data processing in government, business, and industry. They also give the student an understanding of the manager's use of data processing as a vital managerial technique.

Mgt 119: Data Processing Programming
Mgt 120: Data Processing Systems
Stat 111, 112: Business and Economic Statistics I, II

GROUP II: ECONOMICS

The following courses provide the basic academic foundation for such positions as financial economic analyst, industrial economic analyst, and market research analyst in business and government.

B Ad 132: International Business Finance
B Ad 133: Capital Formation
B Ad 176: International Business Theory and Policy
*Econ 101: Intermediate Microeconomic Theory
*Econ 102: Intermediate Macroeconomic Theory
Econ 158: Industrial Organization
Econ 161, 162: Public Finance I, II
Econ 181–82: International Economics
Stat 111, 112: Business and Economic Statistics I, II

GROUP III: FINANCE

The following courses provide the basic academic foundation for such positions as credit analyst, supervisor in a financial institution, bond cashier, trust officer, bank examiner, and similar positions in federal or international financial institutions.

*Acct 111: Financial Statement Analysis
Acct 121: Intermediate Accounting
B Ad 113: Real Estate
B Ad 121: Fundamentals of Insurance
B Ad 122: Insurance Estate Planning
B Ad 132: International Business Finance
B Ad 133: Capital Formation
B Ad 135: Managerial Finance
*B Ad 138: Investment and Portfolio Management
B Ad 163: Law in Relation to the Form of Business Units: Corporations, Partnerships, and Trusts
Econ 101: Intermediate Microeconomic Theory

GROUP IV: MARKETING

The following courses provide the basic academic foundation for such positions as sales manager, marketing manager, product development manager, research director, buyer, advertising director, sales promotion manager, and credit manager.

*B Ad 143: Marketing Research
B Ad 144: International Marketing Management
*B Ad 145: Sales Management
B Ad 147: Advertising
B Ad 158: Physical Distribution Management
B Ad 171: Principles of Transportation

* Required for this group option.

B Ad 175: Introduction to Foreign Trade
B Ad 177: Foreign Markets
B Ad 178: Management of International Business Operations

GROUP V: PERSONNEL MANAGEMENT

The following courses provide the basic academic foundation for such posi
personnel manager, employee relations manager, and employment manager
ness and government service.

*B Ad 106: Problems in Personnel Management
*B Ad 107: Collective Bargaining
Jour 145: Principles and Problems of Public Relations
Psyc 129: Theories of Personality
Psyc 131: Psychological Tests
Sp&D 121: Group Discussion and Conference Leadership

GROUP VI: STATISTICS

The following courses provide the basic academic foundation for such posi
financial statistician, planning statistician, industrial statistician, and rate ana
business and government.

Stat 91: Principles of Statistical Methods
Stat 110: Quality Control and Reliability Techniques
*Stat 111, 112: Business and Economic Statistics I, II
Stat 117: Analysis of Variance
Stat 118: Regression Analysis
Stat 155: Introduction to Probability
Stat 157–58: Introduction to Mathematical Statistics

GROUP VII: TRANSPORTATION AND TRAFFIC MANAGEMENT

The following courses provide the basic academic foundation for management
tions in transportation firms and in traffic departments of other types of bu
firms and government agencies. The program should also aid in the preparatio
the examinations for membership in the American Society of Traffic and Tran
tation.

B Ad 158: Physical Distribution Management
*B Ad 171: Principles of Transportation
B Ad 172: Public Utilities
*B Ad 173: Transportation Systems Management
B Ad 174: Urban Transportation
*B Ad 175: Introduction to Foreign Trade
CE 183: Urban Planning
Geog 125: Transportation Geography

International Business Major

This program is designed to provide the basic academic foundation for pos
in international business, both in private industry and in government. It co
of 39 semester hours of *required* course work and 21 hours of electives.
modification of the program must be made with the consent of the adv

* Required for this group option.

Required—Junior and Senior Years

		Semester Hours
B Ad 102:	Fundamentals of Management	3
B Ad 131:	Business Finance	3
B Ad 132:	International Business Finance	3
B Ad 141:	Basic Marketing Management	3
B Ad 144:	International Marketing Management	3
B Ad 161:	Commercial Law: Contracts, Sales, Agency, Bailments	3
B Ad 175:	Introduction to Foreign Trade	3
B Ad 176:	International Business Theory and Policy	3
B Ad 178:	Management of International Business Operations	3
B Ad 181:	Manufacturing Production	3
Econ 121:	Money and Banking	3
Mgt 118:	Introduction to Data Processing	3
Psyc 144:	Personnel and Industrial Psychology	3
Elective:	The 21 semester hours of elective courses should be selected, in consultation with the adviser, from Accounting, Business Administration, Economics, Geography and Regional Science, Political Science, Sociology, Statistics, or any modern foreign language; however, up to 9 semester hours of courses in other approved areas may be substituted with the permission of the adviser	21
	Total	60

The Master's Degrees

Master of Business Administration.—The degree of Master of Business Administration is this School's top professional Master's degree in business. It is designed to develop the analytical ability and perspective which will contribute to success as a responsible executive. Because of the increasingly close relationship between government and business, the programs for this degree also provide an excellent background for many government careers.

Master of Arts in Government.—Washington, D.C., is uniquely situated for students of public administration. Public figures, professional government administrators, and specialized libraries are resources readily available to this School's programs in public administration. The degree of Master of Arts in Government is designed for graduate students who are seeking an education for entry into the federal service in an administrative capacity, or who wish to emphasize the academic elements of public administration. This program, like the Master of Public Administration and Master of Business Administration degree programs, provides several fields of concentration, such as operations research, urban and regional planning, or behavioral factors in administration, from which the candidate may select for in-depth education.

Master of Public Administration.—The School of Government and Business Administration is located in the midst of a vast complex of government and government-related activities which are local, regional, national, and international in scope. This location provides a living laboratory of public administration for study and access to a unique concentration of working expertise in pub-

lic administration. The Master of Public Administration degree pr
course of study particularly appropriate for those in the government s
is a professional degree, preparing graduates for positions of higher res
ity in the public service and generally improving their competence in pu
ployment. Several elements of the program are taken in common with
in the Master of Business Administration degree program. Work done
degree may lead directly toward the degree of Doctor of Public Admin

Master of Arts in Health Care Administration.—This new professi
gree was authorized by the faculty in 1969 as an alternative to the de
Master of Business Administration and Master of Public Administratio
field of Health Care Administration. Study in depth may be made in
aspects of Health Care Administration found in short-term hospitals, lo
health facilities (such as extended-care institutions, nursing homes, me
pitals, facilities for the aged), group practice clinics, health informat
tems, and comprehensive health planning agencies.

Master of Urban and Regional Planning.—This professional planning
was approved by the Board of Trustees in 1967. The degree is desi
preparation for careers on the municipal, county, state, and nationa
Study is designed to provide a broad professional education, to develop
tence in planning and methodology, and to emphasize the analytical ab
creativity necessary for solving urban and regional problems.

Master of Science in Administration.—The Master of Science in Adm
tion degree is offered only off campus. It provides a course of study app
for those students currently working in government and business. It i
fessional degree, preparing graduates for higher positions and greater
sibility and generally improving their competence as administrators.

ENTRANCE REQUIREMENTS

A Bachelor's degree from an accredited college or university that incl
least 90 semester hours of academic work, with a quality-point index
(a *B* average) in the relevant undergraduate field, is required.

Students who lack sufficient undergraduate study in business or relate
may be required to make up these deficiencies by taking specified underg
courses and maintaining a 3.00 average in those courses.

Applicants for admission to programs leading to the degree of Master
iness Administration must submit acceptable scores on the Admission T
Graduate Study in Business; applicants for admission to programs leading
degrees of Master of Arts in Government, Master of Arts in Health Ca
ministration, Master of Public Administration, and Master of Urban a
gional Planning must submit scores on the Admission Test for Graduate
in Business *or* the Graduate Record Examination. It is the responsibility
applicant to make arrangements for the required test with the Educationa
ing Service, Princeton, N.J. 08540. Correspondence concerning the Adm
Test for Graduate Study in Business should be addressed to Box 966; co
ing the Graduate Record Examination, to Box 955.

GENERAL REQUIREMENTS

A program of greater length, including undergraduate background course

assigned for an applicant whose undergraduate degree was in a field other than the graduate program he wishes to follow, or whose undergraduate record indicates a weakness in required background courses.

Master's degrees are awarded by vote of the Faculty on completion of the required course work, an acceptable thesis (if one is elected or required) or the equivalent work, and the passing of the Master's Comprehensive Examination. An applicant whose background does not include the necessary courses must take a program longer than the minimum hours required.

Second-group courses (numbered 101–200) may be counted toward the Master's degree only when registration for graduate credit has been approved at the time of registration by the Dean and the curriculum adviser. No work counted toward a Bachelor's degree may also be counted toward a Master's degree.

Full-time students are normally expected to register for 9 to 12 semester hours each semester. A graduate student who is employed more than 20 hours a week may not take more than 6 semester hours. All work for a Master's degree must be completed in five years, unless an extension of time is granted by the Dean.

A student who expects to continue his studies for the degree of Doctor of Business Administration or Doctor of Public Administration after receiving the Master's degree should ask for assistance in planning his program so that he may qualify for admission to candidacy for the Doctorate.

No credit is granted for work done *in absentia* or without formal instruction, except for hospital residency, supervised field experience, and the thesis, which may be completed *in absentia* with the permission of the department, curriculum adviser, or committee concerned.

MASTER'S COMPREHENSIVE EXAMINATION

In addition to individual course examinations the candidate must pass a general written Master's Comprehensive Examination. In writing the examination the student is expected to correlate what he has learned in his course work and his reading in the literature of his fields. The examination normally requires from seven to nine hours writing time. Sections broadly cover the various fields in which the candidate has prepared himself.

The examinations are scheduled three times a year, in December, April, and July, and should be taken during the last semester of course registration or shortly after completion of the prescribed course work. If there is a lapse of time between completion of course work and the taking of the examination, the student must maintain continuous registration and must be registered for the semester in which the examination is taken.

The candidate should consult with his adviser, well in advance, as to the dates of his examination and the definition of the subject-matter fields which his examination is to cover. A written application is filed with the department supervising the student's elective field of study no later than 30 days prior to the examination date. Before applying for the examination, the student must have completed all of the courses in his program or be enrolled in his last semester, and he must have achieved a 3.00 (*B*) average. After applying for the Examination, a candidate may withdraw only by notice in writing to his Department Chairman.

A candidate who fails the examination may, in exceptional circumstances and with specific approval of his advisers, repeat the examination, but only

after the lapse of one semester and the undertaking of additional prepa prescribed. *If he fails a second time, no further opportunity to take th nation will be permitted.*

SCHOLARSHIP

Grades for graduate work are *A*, Excellent; *B*, Good; *C*, Minimum Fail; *I*, Incomplete; *W*, Authorized Withdrawal; and *CR*, Credit.

An average of *B* or better is required for the Master's degree. The gr is not considered as failing but must be counter-balanced by a grade o graduate course of equal status.

A Master's degree candidate who receives a grade of *F* is required to cause for consideration by the Dean's Council as to why he should be to continue his studies.

Whenever a grade has not been assigned, the symbol *I* (incomplete) symbol *W* (authorized withdrawal) will be recorded. The symbol *I* i that a satisfactory explanation has been given to the instructor for the s failure to complete the required work of the course. An "incomplete" be made up after the lapse of one calendar year except by written permi the Dean's Council. An incomplete which is not removed within one c year is automatically changed to an *F*. An incomplete cannot be remo reregistering for the course.

REQUIRED COURSES IN ADMINISTRATION (Certain Fields)

The following courses in general administrative theory and practice are r of all candidates for the degree of Master of Business Administration an ter of Public Administration.

Mgt 201: Advanced Administrative Management
Mgt 204: Quantitative Factors in Administration
Mgt 207: Human Behavior in Organizations

In addition, each student is normally required to take, from the fol group, the course appropriate to his specific area of concentration:

Acct 276: Management Planning and Control
B Ad 257: Operation of the Multinational Firm
B Ad 297: Case Studies in Business Administration
HCA 206: Case Studies in Health Care Administration
P Ad 214: Policy Analysis in Public Administration, or
P Ad 260: Seminar: Policy Formulation and Administration

THE THESIS

A thesis is required in certain degree programs and optional in others dents contemplating doctoral study are strongly urged to include the as a part of their Master's program. The thesis subject should be selected early as possible so as to permit effective integration with the course

The subject must be approved by the professor in charge of the student The thesis in its final form must have the approval of the professor in

must be presented to the Dean by the student no later than the date an-nced in the calendar. Printed copies of detailed regulations regarding the n and reproduction of the thesis are available in the Office of the Dean. ayment of tuition for the thesis entitles the candidate, during the two semes- he registers for thesis (299–300), to the advice and direction of the mem- of the Faculty under whom the thesis is to be written. In case a thesis is nished, an additional successive academic year is granted without further ion payment. The student must, however, maintain continuous registration ing this period. If the preparation of the thesis extends more than three se-sters beyond the date he registers for thesis 300, the student must register for entire 6 hours of thesis again and pay tuition as for a repeated course.

MASTER OF BUSINESS ADMINISTRATION

rricula leading to the professional degree of Master of Business Administra-n incorporate the recognized common core of instruction in business admin-ration, the required courses in administration (see page 146), and an ective field of concentration planned in consultation with a faculty adviser. ective fields normally comprise 9 to 15 semester hours of an individual dent's program.

An applicant must have a Bachelor's degree from an accredited college or niversity.

The degree is awarded by vote of the Faculty upon satisfactory passing of the aster's Comprehensive Examination, and the submission of an acceptable hesis. The complete program consists of 60 semester hours. A student who as completed an undergraduate major in accounting or in business adminis-ration with a good record *may qualify* under a minimum acceptable graduate redit program of 36 semester hours. No more than 6 hours of graduate ourse credits can be transferred from other accredited institutions, and each ransfer of credit must be approved by the Dean.

The Master's Comprehensive Examination may not be taken before the last emester of course work.

FIELDS OF CONCENTRATION

ACCOUNTING

The field of concentration in Accounting is designed to provide a contemporary, broad-based academic preparation which will apply equally to the fields of ac-counting in government, industry, and public practice as well as to the field of general administration employing accounting as an effective means of under-standing the organization.

A common body of knowledge in business administration is required of all candidates in this program. This knowledge may be obtained as part of an un-dergraduate degree in business or as a part of the total Master of Business Ad-ministration program.

BEHAVIORAL FACTORS IN ADMINISTRATION

The curriculum in this program reflects the assumption that the effective utili-zation of the behavioral sciences is concerned with both means and ends; that

the specialist in behavioral science is not only skilled in theory and r
also applies his technical and specialized knowledge as a conscious f
fective organizational growth and improvement. Thus, courses are d
equip the student with organizational concepts and behavioral skills a
to optimizing the utilization of a system's total resources.

This program is designed to fulfill the need for professionals capa
signing, creating, and developing the necessary behavioral and orga
systems appropriate to rapidly changing societies. Emphasis is on the
tionships of such dimensions as motivation, leadership, problem-solvin
zational growth, and increased complexity of modern organizations
effect upon the functions of organizational development.

BUSINESS-GOVERNMENT RELATIONS

This field of concentration provides a knowledge and understanding of
business environment essential to business policy formulation and ex
gives a keener appreciation of the role and function of business in a fr
prise society, its environmental needs for optimum effectiveness, and w
ernment can and should contribute to that environment; familiarizes
with successful techniques by which the content and direction of public
toward business can legally be influenced; and provides students with a th
knowledge of current government policies toward business, contemporar
affecting government-business relations, and possible solutions to probl
this area.

This field serves the needs of students of the business environment
Master's and Doctoral levels and is based on the premise that the enorm
fluence of government on business and vice-versa—exercised in the
regulator, customer, supplier, protector, and competitor—will becom
more pervasive and that business policy formulation and execution and
decision-making will become increasingly dependent upon thorough kn
and understanding of the total environment of business and, most imp
of government policies, programs, and laws affecting business.

DATA PROCESSING

The field of concentration in Data Processing provides a broad unders
of the principles of manual, mechanical, and electronic data processing
ing computer programming concepts, methods, and languages; an appre
of the capabilities and the limitations of data processing equipment; a k
edge of the phases of management information systems development; a
understanding of management's role in data processing. It provides an
ciation of the role of data processing as a tool of management.

FINANCE AND INVESTMENTS

The field of concentration in Finance and Investments prepares studen
careers in finance and investments, providing a background in business f
ing, controllership, treasury, long-range planning, reporting, and financial
agement processes. Courses are designed to emphasize the planning, anal
implementation, and controls necessary for making effective financial decis
Instruction not only applies to manufacturing and trading enterprise but, i
dition, includes railroad and public utility financing. Each, however, has

ve operating features. Most financial dogmas have a universality that cuts s business lines, and variations are more a matter of degree than a form of antive difference.

LTH CARE ADMINISTRATION

programs in Health Care Administration lead to the degrees of Master of in Health Care Administration, Master of Business Administration, and ter of Public Administration. The majority of students begin their studies he fall semester of each year. However, a limited number of qualified stu- ts may be admitted to begin their course work in the spring semester and mer sessions. The basic curriculum for the degree of Master of Arts in alth Care Administration is developed in keeping with the background and fessional goals of each student and ordinarily consists of a minimum of 48 nester hours. The basic curriculum for the Health Care Administration con- ntration leading to the degrees of Master of Business Administration or aster of Public Administration ordinarily consists of a minimum of 48 se- ster hours. Undergraduate courses in Accounting, Economics, and Statistics e required as a prerequisite for all of these degree programs. Master of siness Administration degree candidates must also complete selected required undation courses.*

Ordinarily full-time students can expect to complete the on-campus phase of e degree program in two to four semesters over a period of one to two aca- mic years. The total time depends on past academic course work and ex- rience in the health care field.

Hospital Administration.—The program in Hospital Administration is divided to two phases. During the first phase the student must complete a satisfactory cademic program of course work, selected in accordance with his background nd needs. These courses cover the general and technical background of hospi- l administration, general administrative theory and practice, and problem-solv- g in the area of management as it relates to short-term hospitals. The second hase is a period of either on-the-job residency† under qualified administrative pervision or supervised field experience, for which the student receives up to semester hours of academic credit. A written major report is required as part f phase two. The length of the residency is dependent upon the area of con- ntration and the individual student's needs.

Administration of Long-term Care Facilities.—The concentration in Ad- inistration of Long-term Care Facilities is designed to prepare students for the dministration of facilities for the aged, extended-care facilities, and mental ospitals.

During the first phase the student must complete a satisfactory academic pro- ram of course work, selected in accordance with his background and needs. hese courses cover the general technical background of hospital administra- on, general administrative theory and practice, and problem-solving in the anagement of long-term care facilities. The second phase is a period of either n-the-job residency† under a qualified administrative supervisor or supervised eld experience, for which the student receives up to 9 semester hours of aca- emic credit. A written major report is required as part of phase two. The

* Required foundation courses for Master of Business Administration degree candidates include ommercial Law, Marketing, Finance, Production, and Mathematics (calculus to the first variable).
† In selected cases, a combined residency can be arranged in more than a single concentration.

length of the residency is dependent upon the area of concentratio
individual student's needs.

Health Information Systems.—The concentration in Health Inform
tems recognizes the rapidly growing demand for individuals who ca
and implement the use of computer-based information systems in dec
ing approaches. It is designed to prepare those who wish to supervis
ordinate data collection, processing, and retrievable activities for h
complexes.

During the first phase the student must complete a satisfactory acad
gram of course work, selected in accordance with his background a
These courses cover the general and technical background of hospital
tration and general administrative theory and practice. In addition
courses in computer services and information handling must be inclu
second phase consists of supervised field experience. A written major
required as part of phase two.

INTERNATIONAL BUSINESS

The field of concentration in International Business is designed to prep
dents for careers in firms operating on a multinational basis or about
the international field; for careers in the federal government and in inter
agencies concerned with business, industry, and finance abroad; and
Commerce option of the Foreign Service Officer Examination.

This program is also designed to provide foreign students with the
ground and skills necessary to promote international business, and to
them for careers in foreign and domestic firms within their own countr
for commercial officer positions within their governments.

Each student's program is individually developed by the student's adv
cording to the student's background and interests.

MANAGERIAL ECONOMICS

The field of concentration in Managerial Economics is the study of eco
institutions and analytical methods, taken from the point of view of busi
governmental management. Its purpose is to develop (1) a broad under
ing of the tools of economics; (2) an analytical power with respect to
facets of an organization's activity or multi-organizational areas of speci
est; (3) a skill in problem-oriented applications of economic tools; (4) a
ity to interpret historical development and predict future trends in firms,
tries, and economies; (5) a familiarity with the institutional setting of eco
activity; and (6) an appreciation of the economic reasoning behind publ
cies.

With a strong orientation to the economic problems of organizations,
field of concentration is based on the methodology of general economics
it supplements with the methods of management science.

Managerial economics presumes skills in quantitative methods, statistics
intermediate-level general economics. It is offered in a sequence that
mences with courses based on microeconomic and macroeconomic tools
tively, which can be taken in either order but must be preceded by the pre
site courses. The third course in the sequence is a seminar which must
the first two.

RKETING

e field of concentration in Marketing encompasses all phases of supply and nand, from procurement and materials handling to product presentation and ribution. A student may concentrate in several subfields: marketing re- rch, sales management, advertising, retailing, and international marketing. In dition, study may be complemented with courses from fields such as anthro- logy, geography, journalism, mathematics, psychology, sociology, and others.

PERATIONS RESEARCH AND SYSTEMS ANALYSIS

he field of concentration in Operations Research and Systems Analysis de- lops a thorough understanding of quantitative or mathematical approaches to roblems of managerial control and decision-making. While the program will evelop a competent background in basic mathematical theory associated with he various techniques, it is oriented toward applications of the techniques ather than their theoretical mathematical content.

ERSONNEL MANAGEMENT

ersonnel Management is concerned with all aspects of the employment of human resources in business organizations. It is a challenging field—dynamic nd rapidly growing in scope and importance. Career opportunities are open in domestic and international business organizations, hospitals, trade associations, research and educational institutions, and local, state, and federal government agencies. Courses encompass all phases of the recruitment, selection, employ- ment, and development of people, industrial relations, unionism, collective bar- gaining, labor relations, and manpower utilization.

ROCUREMENT AND CONTRACTING

The field of concentration in Procurement and Contracting responds to the rec- ognized need for greater professionalism and sophistication among those en- gaged in procurement activities of the federal government and in contracting activities of vendors to the federal government.

The sustained increase in federal purchasing—in volume, variety, and com- plexity—places ever greater demands upon the skill and resourcefulness of pro- curement and contracting personnel. The field has therefore been designed with the following objectives: (1) to provide a broad professional education in the knowledge and skills necessary for success in this field; (2) to develop in the student increased ability in analysis, decision-making, and communication; (3) to increase the student's appreciation of the economic, social, legal, and tech- nological considerations present in procurement and contracting activity.

RESEARCH AND DEVELOPMENT: POLICY AND MANAGEMENT

The field of concentration in Research and Development: Policy and Manage- ment explores the many aspects of technology relating to and influencing re- search and development management, business, and public policy. The employ- ment of "state-of-the-art" technology and the creation of new technology through research and development are important processes in the achievement of the objectives of both private firms and governments.

The research and development environment has many unique op characteristics. The program of graduate study in this concentration designed to identify and study the problems associated with managing professional people in a dynamic technology. As a contextual area, gram stresses the need for students to undertake original and meani search involving political, economic, sociological, and operational prob countered by management in industrial, governmental, and military and development organizations.

TRANSPORTATION

The field of concentration in Transportation is concerned with both pri public planning and the management of a viable transport system wh best serve the needs of the nation and its industries within a competitive work. It is an integral function of all levels of government as well as unit of industry throughout the nation.

MASTER OF PUBLIC ADMINISTRATION

Curricula leading to the professional degree of Master of Public Admini are available in the fields of Health Care Administration, Personnel M ment, Public Administration, and Urban and Regional Planning.

PUBLIC ADMINISTRATION

This program provides a course of study appropriate for those student rently in government or with appreciable past experience in governm those with other than an undergraduate social science degree. The deg Master of Public Administration is a professional degree, preparing gra for positions of higher responsibility in the public service and generally ing their competence in public employment. Work done for this degre lead directly toward the degree of Doctor of Public Administration.

The degree is awarded by vote of the Faculty upon satisfactory passing Master's Comprehensive Examination and the submission of an acceptab sis. The academic program ranges from 36 to 60 semester hours, depe upon the background and experience of each student. Six semester hours program represent major research and preparation of a thesis. Students have strong undergraduate backgrounds in political science, history, econo business administration, sociology, or psychology, or who have had appro career experience closely related to such fields, will ordinarily require mum amount of course work to qualify for the degree. Each student de an individual program in consultation with his faculty adviser to prepa the Master's Comprehensive Examination.

No more than 6 hours of graduate credit can be transferred from othe credited institutions, and any transfer of credit must be approved by the

The course work for the degree of Master of Public Administration must clude the *required* courses in administration (page 146). Other courses selected, with the approval of the adviser, to prepare the student for the M Comprehensive Examination, which covers three fields of study. The administrative theory and practice is required of all students. The oth

ds may be chosen from administration in the federal government, compara- and development administration, data processing and systems management, vernment-business relations, health care administration, human behavior in anizations, international administration and trade, metropolitan administra- and urban affairs, public financial management and budgeting, public per- nel administration, regional planning, urban planning and design, research d development policy and management, and closely related management and cial science fields.

A thesis, which may be a major case study, is prepared under the guidance an approved director.

EALTH CARE ADMINISTRATION

he programs in Health Care Administration are described on pages 149-50, nd lead to the degree of Master of Arts in Health Care Administration, Master f Business Administration, or Master of Public Administration.

ERSONNEL MANAGEMENT

The program in Personnel Management leads to the degree of Master of Public Administration (if elective emphasis is directed toward Public Administration), o the degree of Master of Business Administration (if elective emphasis is di- ected toward Business Administration), or to the degree of Master of Arts in Government.

The course work must include the *required* courses in administration (page 146) and the thesis (P Ad 299–300 or B Ad 299–300). Each individual stu- dent's program is arranged in consultation with a curriculum adviser.

URBAN AND REGIONAL PLANNING

The program in Urban and Regional Planning is designed to provide an intro- duction to planning theory and methodology for students who are working to- ward the degree of Master of Public Administration. The standards for the pro- gram are similar to those for the Public Administration curriculum outlined on pages 152–53. The student is expected to include public administration, federal or metropolitan, as an integral part of his studies. With the counseling of an adviser, each program is individually planned in accordance with the interest and goal of the student.

MASTER OF URBAN AND REGIONAL PLANNING

The program of graduate study in Urban and Regional Planning leads to the professional planning degree of Master of Urban and Regional Planning. It is designed as preparation for careers on the municipal, county, state, and national levels, and for private professional practice. The course of study is designed to provide a broad professional education, to develop competence in planning and methodology, and to emphasize the analytical ability and creativity necessary for solving urban and regional problems. Each student's program is designed in consultation with an assigned faculty adviser in accordance with his individ- ual career plans.

The degree is awarded by vote of the Faculty after satisfactory com
(1) from 45 to 60 semester hours of course work, depending upon
ground and experience of each individual student, including a thesis
to 6 semester hours (most students will ordinarily be required to take
ter hours); (2) a minimum of three months' full-time professional tra
planning agency under qualified supervision, with an acceptable writ
to be submitted after completion of the training period; (3) a writte
Comprehensive Examination; and (4) a thesis based on the candidate'
in the field of urban and regional planning.

MASTER OF ARTS IN GOVERNMENT

Curricula leading to the degree of Master of Arts in Government are
in the fields of Personnel Management, Public Administration, and U
Regional Planning.

The programs leading to this degree require a minimum of 36 semes
of work, which includes a thesis equivalent to 6 semester hours.

Second-group courses (numbered 101–200) may be counted toward
ter's degree up to a maximum of 12 hours, but only when registration
uate credit has been approved at the beginning of the course by the fa
viser and instructor. No work counted toward a Bachelor's degree may
counted toward a Master's degree.

PERSONNEL MANAGEMENT

The program in Personnel Management leads to the degree of Master o
Government, to the degree of Master of Business Administration (if
emphasis is directed toward Business Administration), or to the degree
ter of Public Administration (if elective emphasis is directed toward
Administration).

PUBLIC ADMINISTRATION

The program, in contrast to the professional program leading to the deg
Master of Public Administration (see pages 152-53) is designed for
who wish to emphasize the academic elements of public administration
also serve as a basis for later study toward the doctoral degree. It is a
degree objective for students who have just completed the Bachelor's

Each student is expected to prepare himself for a Master's Compre
Examination, which covers three fields. The field of administration and
formulation in government is required. The other two may be selected
such fields as comparative and developmental administration, data proc
and systems management, government-business relations, human behavior
ganizations, international administration and trade, metropolitan admin
and urban affairs, public financial management and budgeting, public per
administration, regional planning, and urban planning and design. Relate
ies may be selected from accounting, economics, geography, history, p
science, psychology, and sociology.

The course work is planned with an adviser.

URBAN AND REGIONAL PLANNING

The program in Urban and Regional Planning leading to the degree of Master of Arts in Government is designed to provide planning theory and methodology for students who have an undergraduate degree in the social sciences. The student is expected to include public administration, federal or metropolitan, as an integral part of his studies, as well as courses in urban planning and design or regional planning. Under the counseling of an adviser, each program is individually planned in accordance with the interest and goal of the student.

MASTER OF ARTS IN HEALTH CARE ADMINISTRATION

Curricula leading to the degree of Master of Arts in Health Care Administration are available with concentrations in Hospital Administration, Administration of Long-term Care Facilities, Health Information Systems, and Comprehensive Health Planning.

HOSPITAL ADMINISTRATION

The concentration in Hospital Administration is described on page 149, and leads to the degree of Master of Arts in Health Care Administration, Master of Business Administration, or Master of Public Administration.

ADMINISTRATION OF LONG-TERM CARE FACILITIES

The concentration in Administration of Long-term Care Facilities is described on pages 149-50, and leads to the degree of Master of Arts in Health Care Administration, Master of Business Administration, or Master of Public Administration.

HEALTH INFORMATION SYSTEMS

The concentration in Health Information Systems is described on page 150, and leads to the degree of Master of Arts in Health Care Administration, Master of Business Administration, or Master of Public Administration.

COMPREHENSIVE HEALTH PLANNING

The concentration in Comprehensive Health Planning leads to the degree of Master of Arts in Health Care Administration. This program is designed to prepare students to plan for and coordinate all aspects of private and public health care systems in accordance with sound management principles. It is an interdisciplinary program which includes course offerings in the areas of environmental health, medical care organization, mental health administration, sociology, and urban and regional planning.

The first phase of the program consists of the required courses in health care administration, plus required courses in comprehensive health planning. The second phase consists of supervised field experience. A written major report is required as part of phase two.

Post-Master's Graduate Certificate in Health Care Administration

STUDENTS WITH APPROVED MASTER'S DEGREES from accredited institu
take a special Post-Master's program leading to a Post-Master's Gra
tificate in Health Care Administration. Each program will be planne
the professional needs of the individual student, whether he wishes to
a new field of study or to amplify his knowledge of work done at th
level.

This program permits study in depth of such areas as health care a
tion consulting; comprehensive health planning; government health ca
istration at federal, state, and county levels; long-term care administr
cluding mental hospitals, nursing homes, and facilities for the aged; a
care administration research.

Prerequisite: a Master's degree from an accredited college or unive
an academic average which indicates the ability to undertake advanc
The applicant is also judged on his experience, character, and persona
plicants lacking formal study in health care administration are require
qualifying courses.

REQUIREMENTS FOR THE CERTIFICATE

Most students with adequate preparation in the health care field sh
able to complete the requirements by taking a program of study with
mum of 30 semester hours of course work. Those lacking such specializ
will need more. At the discretion of the student's advisory committee
mum of 6 semester hours may be transferred from another accredited
tion if the work was taken for credit toward a graduate degree.

PROGRAM OF STUDIES

HCA 270 *Research is Health Care Administration* is required of all can
for the Certificate. The remaining courses consist of a program of study w
out in consultation with a faculty adviser and planned with consideration
student's experience and educational background and his specific profes
objectives.

Doctoral Study

WORK FOR THE DEGREES of Doctor of Business Administration and Do
Public Administration is under the supervision of the Committee on D
Studies.

ADMISSION

Completed application forms must be sent to the Office of the Admissions
cer, School of Government and Business Administration, George W
ton University, Washington, D.C. 20006. The applicant should ask three
viduals, who are acquainted with his ability to do high-level academic w
write directly to the Chairman of the Committee on Doctoral Studies

ers of reference should be on special forms which will be provided by the mmittee Chairman. Applicants for the degree of Doctor of Business Admin- tration must file results of the Admission Test for Graduate Study in Business h the Office of the Admissions Officer before final approval of their appli- ions can be given. Applicants for the degree of Doctor of Public Adminis- tion must submit results of either the Admission Test for Graduate Study in siness *or* the Graduate Record Examination to the Office of the Admissions ficer. These tests must have been taken within the past five years. Arrange- ents to take these tests must be made with the Educational Testing Service, 20 assau Street, Princeton, N.J. 08540; or 1947 Center Street, Berkeley, Calif. 4704.

An applicant must have a degree of Master of Business Administration or Master of Public Administration, as appropriate; or a Master of Arts degree in n approved field; or the equivalent, together with acceptable personal qualities nd a capacity for creative scholarship. Each applicant must demonstrate his ompetence by qualifying examinations.

PLAN OF STUDY

The fields of (1) Administrative Theory and Practice and (2) Managerial Economics are required for the Doctor of Business Administration degree; the fields of (1) Administrative Theory and Practice and (2) American Political Process and Public Administration are required for the Doctor of Public Administration degree. The Chairman of the Committee on Doctoral Studies, in consultation with the applicant, will designate two elective fields of study and will appoint an adviser to guide the student in his work in each of the fields undertaken. Most students will complete, prior to the General Examination, a minimum of 30 semester hours in graduate courses and such additional course work as may be prescribed by the adviser; but, the exact content of each program is determined in light of the student's background and competence after consultation with the appropriate faculty member in each of the fields undertaken.

Full-time students are normally expected to register for 9 to 12 semester hours each semester. All work for the Doctor's degree must be completed in five years unless an extension of time is granted by the Committee on Doctoral Studies prior to the expiration of the time limit. All course work must be taken on campus unless otherwise approved in advance by the Dean.

When the applicant has completed all course work and has satisfied his adviser and the Committee of his readiness to take the General Examination in the fields of study previously designated, the examination will be scheduled during the following February or October.

Upon successful completion of the General Examination and approval of the subject of the doctoral dissertation, the student may be admitted to candidacy by the Committee on Doctoral Studies. The candidate's research and the preparation of his dissertation are supervised by a Research Adviser designated by the Committee.

After admission to candidacy, the student must register for 24 hours of *Dissertation Research* (399). Full-time students must register for 9 to 12 hours a semester for 2 semesters, and for sufficient hours in the third semester to complete the 24-hour requirement. Part-time students must register for 6 semester hours a semester for 4 semesters. If the dissertation has not been completed

during the time the student has registered for the required 24 hours, h
register for 3 semester hours of *Dissertation Research* (399) each succ
semester until the satisfactory completion of the dissertation and the fi
examination.

THE DISSERTATION

A dissertation is required as evidence of ability to perform scholarly re
and to interpret and present its results.

No later than the date specified in the calendar the candidate must sub
the Dean three complete copies of the dissertation and an original copy
abstract of his dissertation for inclusion in the Announcement of the Fin
amination and for reproduction by University Microfilms, Inc.

Printed copies of detailed regulations regarding the form and reproduc
the dissertation, preparation of the abstract, and services offered by Un
Microfilms, Inc., are available in the Office of the Committee on Do
Studies. The successful candidate for the doctorate is required, before rec
his degree, to pay a fee to cover the expense of printing the abstract
dissertation, and for the basic service rendered by University Microfilms
(see page 31).

THE FINAL EXAMINATION

The Final Examination of the candidate consists of his oral defense of th
sertation. The Examination will be given by a committee appointed
Committee on Doctoral Studies. Upon successful completion of this oral e
nation the candidate will be approved for the degree of Doctor of Busines
ministration or Doctor of Public Administration by the Committee on Do
Studies.

RESIDENCE

The Committee on Doctoral Studies expects all students to remain regi
until *all* degree requirements are satisfied, although there is no formal r
tion concerning the minimum amount of time of study either in preparati
the General Examination or as a doctoral candidate engaged in research
student who undertakes either part of the doctoral program on a full or
schedule must maintain "continuous registration" under the School of G
ment and Business Administration even when he is granted a leave of ab
for study or residence elsewhere. By failing to register for one semes
more, the student breaks his registration and must apply for readmission
School under whatever new conditions and regulations are set up by the
mittee or the member of the Faculty who directs his research. The studen
has completed his tuition requirements, but whose graduation is defer
any reason, must maintain continuous registration by paying the cont
registration fee for the semester immediately preceding the graduation at
he expects to receive his degree.

OVERNMENT MANAGEMENT INTERN SCHOLARSHIP PROGRAM

HE GOVERNMENT MANAGEMENT INTERN SCHOLARSHIP PROGRAM offers annually fty scholarships to assist federal agencies in training carefully selected young en and women for administrative leadership in government career service. ach scholarship provides a tuition-free course of 3 semester hours a semester, nd interns who maintain satisfactory standing in both their academic program nd their government training program may qualify for extension of the schol- rship for one additional semester.

AVY GRADUATE FINANCIAL MANAGEMENT PROGRAM

The Navy Graduate Financial Management Program, sponsored by the Naval ostgraduate School, provides 50 semester hours of work in financial manage- ent and related fields for a selected group of Naval and Marine officers. The Master of Business Administration degree is awarded upon successful comple- ion of this full-year program.

CONTINUING EDUCATION IN HEALTH CARE ADMINISTRATION

A nondegree program is conducted in the various areas of health care adminis- tration both on campus and off campus whenever a sufficiently large class is or- ganized. Institutes, workshops, and lecture series are conducted under the aus- pices of program faculty and selected leaders from local, state, and regional areas on topics of current interest to the requesting organization. There is no specific prerequisite. Fees are to be announced.

THE INTERNATIONAL INSTITUTE FOR HEALTH CARE ADMINISTRATION

In recognition of special educational needs of students from other countries, The International Institute for Health Care Administration offers programs of instruction designed to meet these needs at either the degree or certificate level.

It is also equipped to enter into arrangements with principals of hospital sys- tems in world-wide areas to assist in the preparation of teaching programs or the actual instruction of administrative personnel either abroad or at the Uni- versity.

THE MANAGEMENT RESEARCH GROUP

The Management Research Group seeks to serve government, industry, and commerce by contributing to the development and understanding of basic theory in the field of management. The Group also provides assistance in translating theory into practice.

Relationships and techniques important to modern information flow and man- agerial decision-making are stressed. The research conducted extends to system design, analysis of system performance, and the evaluation of practice in rela- tion to managerial criteria.

CERTIFICATION OF PUBLIC PURCHASING AGENTS

The School of Government and Business Administration participates in the Na- tional Institute of Governmental Purchasing professional certification program.

Courses and examinations leading to qualification as "Certified Public
ing Officer" (CPPO) are provided. Inquiries may be directed to the S
to the National Institute of Governmental Purchasing, 1001 Connecti
nue, N.W., Washington, D.C. 20036.

OFF-CAMPUS DEGREE PROGRAMS

The School of Government and Business Administration has academic
tion over off-campus programs leading to the following degrees: Bach
Science in Administration with concentrations in accounting and busin
ministration and the Master of Science in Administration.

These degree programs are administered by the College of General
For details concerning the off-campus programs see the *College of*
Studies Catalogue.



SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

Dean B.M. Sapin

FACULTY*

rofessors Joseph Aschheim, J.W. Brewer, A.E. Burns, R.H. Davison, C.E Galbreath, Andrew Gyorgy, H.C. Hinton, W.C. Hopkins, Ching-Yao Hsieh, J.W. Kendrick, W.H. Kraus, H.L. LeBlanc, R.K. Lewis, H.M. Merriman, F.H. Michael, J.N. Mosél, Benjamin Nimer, Vladimir Petrov, J.W. Robb, H.M. Sachar, B.M. Sapin, R.P. Sharkey, Chung-wen Shih, Gaston Sigur, Henry Solomon, George Stambuk, C.T. Stewart, Jr., R.B. Thompson, R.K. White, Kurt Wilk (*Visiting*), Helen Yakobson

djunct Professor C.B. Sargent

ssociate Professors R.M. Dunn, Jr., C.F. Elliott, Marvin Gordon, P.P. Hill, W.R. Johnson, Young Kim, C.A. Linden, J.K. McDonald, J.A. Morgan, Jr., C.A. Moser, Peter Poole, Bernard Reich, Richard Thornton, R.Y.C. Yin

ssistant Professors R.E. Darcy, J.E. Fredland, D.L. Lee, J.M. Logsdon, P.L. Sargent (*Visiting*), J.M. Starrels, G.C.Y. Wang, S.J. Wayne

nstructors S.W. Burks, K.L. Storrs

COMMITTEES†

DEAN'S COUNCIL

R.M. Dunn, Jr., C.F. Elliott, P.P. Hill, H.C. Hinton, W.R. Johnson, J.M. Logsdon, J.A. Morgan, Jr., Vladimir Petrov, S.J. Wayne

COMMITTEE OF PROGRAMS AND CURRICULUM

R.M. Dunn, Jr., H.C. Hinton, H.L. LeBlanc, Benjamin Nimer, R.B. Thompson

COMMITTEE ON ADMISSION AND ADVANCED STANDING

F.H. Michael (*Chairman*), C.F. Elliott, Andrew Gyorgy, W.R. Johnson, J.A. Morgan, Jr.

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† The President of the University, the Vice President for Academic Affairs, the Registrar of the University, the Director of Admissions of the University, and the Director of Libraries of the University are ex officio members of the Faculty of the School of Public and International Affairs. The Dean of the School is an ex officio member of all committees.

COMMITTEE ON CHINESE STUDIES

W.R. Johnson (*Chairman*), H.C. Hinton, F.H. Michael, Chung-wen Shi
ard Thornton, R.Y.C. Yin

COMMITTEE ON RUSSIAN STUDIES

C.A. Moser (*Chairman*), C.F. Elliott, John Hardt, Vladimir Petro
Thompson, Helen Yakobson

COMMITTEE ON SCIENCE, TECHNOLOGY, AND PUBLIC POLICY STUDIES

C.E. Galbreath, Andrew Gyorgy, J.M. Logsdon, J.K. McDonald, Be
Nimer

INTRODUCTION

With the establishment, in 1898, of the School of Comparative Jurispr
and Diplomacy, the study of Government was first organized as a
entity in the University. In 1928, this School was reorganized and bro
as the School of Government. During tht next two decades, progra
business administration and public administration were added, and the em
gradually shifted from undergraduate to graduate study. The name was ch
in 1960 to the School of Government, Business, and International Affa
reflect more accurately the offerings of the School. A division of the
was effected in 1966, and two schools were established—the School of Ur
ment and Business Administration, a primarily professionally-oriented
and the School of Public and International Affairs, a primarily policy-ori
school.

Programs of the School of Public and International Affairs are interdi
nary, and emphasize governmental policy, both domestic and foreign.

Students in the freshman and sophomore years are registered in Colu
College of Arts and Sciences, the liberal arts college of the University, a
assigned special advisers from the School of Public and International A
to assist them in planning their programs.

ACADEMIC PROGRAMS

Programs available within the School of Public and International Affa
undergraduate fields in Chinese Language and Literature and Chinese Stu
undergraduate and graduate fields in International Affairs and Public A
and graduate fields in Russian Studies and in Science, Technology, and P
Policy. Special programs in Soviet, Far Eastern, and East European st
are offered by the School's Institute for Sino-Soviet Studies.

OBJECTIVES

Three undergraduate programs of study—Chinese Studies, International Affa
and Public Affairs—are aimed at preparing the student to understand
contemporary issues in international affairs or in domestic public affairs

ograms are designed not to produce narrow professional specialists, but to ster a liberal education, interdisciplinary in nature and broader than a con- ntration in one of the conventional disciplines. In each program there is uble effort: to develop a background as broad and as deep as possible in der to assist in the understanding and analysis of modern problems, and to ve instruction in some useful tools of analysis. The program in Chinese anguage and Literature is closer to the traditional liberal arts pattern, em- asizing language and culture.

The graduate programs leading to the degree of Master of Arts are more ncentrated. The student is expected to develop a greater competence in an ea or a discipline, building on his undergraduate program in preparation for ofessional employment in government, in international organizations, in busi- ss, or in private agencies concerned with public or international affairs.

REGULATIONS

egulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES *are ated on pages 23–34; other University regulations, on pages 45–53.*

TTENDANCE

student may not attend classes until registration is completed and fees due e paid.

The student is held responsible for all the work of the courses in which he is gistered, and all absences must be excused by the instructor in charge before rovision is made for him to make up the work missed.

A student suspended for any cause may not attend classes during the period f suspension.

ITHDRAWAL

ithdrawal after the end of the fifth week of classes (fall or spring semester) ithout academic penalty is permitted only in exceptional cases (see "With- rawal," page 48).

The Degree of Bachelor of Arts

E SCHOOL OFFERS PROGRAMS leading to the degree of Bachelor of Arts in the elds of Chinese Language and Literature, Chinese Studies, International Affairs, nd Public Affairs.

ENTRANCE REQUIREMENTS

he satisfactory completion of the *Chinese Language and Literature, Chinese udies and International Affairs,* or *Public Affairs* curriculum in Columbian ollege of Arts and Sciences (see pages 82–83), or the equivalent, is required.

REQUIREMENTS FOR THE DEGREE

ACADEMIC WORK LOAD

A full-time student not on probation may not ordinarily take more semester hours. A student employed more than 24 hours a week wi on probation may not take more than 9 semester hours.

A full-time student with grades of *A* in 60 per cent or more of h work may not take more than 18 semester hours. A student employ than 24 hours a week who has grades of *A* in 60 per cent of his cou may take up to 12 semester hours.

A student who accepts employment after registration or at any time semester must report immediately to the Dean, so that his program may justed if necessary.

Exceptions to these rules require the approval of the Dean.

SCHOLARSHIP

In order to graduate, a student must have the following: (1) 120 hours of passing grades (courses in Physical Education, Health, and Re cannot be included in the 120 hours) and (2) grades of *A* or *B* in ha courses taken in the major. The major includes the required second courses (101-200) and courses taken in the group options.

DEAN'S HONOR LIST

The name of every student who achieves grades of *A* in at least 60 p of his course work is placed on the Dean's Honor List for that semest pearance on the List will be limited to (1) full-time students registered minimum of 12 semester hours and (2) part-time students registered minimum of 12 semester hours over a period of two consecutive sem which may include a summer term.

ACADEMIC STANDING

A student who is not suspended or on probation is considered to be in standing.

The following rules governing probation and suspension are appli stated to students enrolled for a full-time program (12 semester hours during the fall or spring semester. Students enrolled for less than 12 hours during the fall or spring semester and students enrolled during mer sessions are subject to probation or suspension on the basis of the for 12 semester hours, or multiples thereof, rather than on their record one semester.

PROBATION

A student who in one semester receives two grades of *F* in courses 3 or more semester hours of credit each, or the equivalent, is placed on bation. A student on probation who receives one grade of *F* in such will be continued on probation for a second semester. A student on pro

ing 12 or more semester hours whose grades are all *C* or better is removed m probation.

SPENSION

student who in one semester receives grades of *F* in three courses carrying or more semester hours of credit each, or the equivalent, is suspended. A dent on probation who receives two or more grades of *F* in such courses is pended. A student who receives one or more grades of *F* in such courses a second semester on probation is suspended.

A student who is suspended for poor scholarship may apply for readmission ter the lapse of either the fall or spring semester. To be considered for readission, he must pass prescribed tests and submit evidence to the Dean's Coun- that during his absence from the University he has so conducted himself as indicate that he will profit by readmission. A student readmitted after susension is on probation. In no case will the probationary period after readmison exceed 24 hours of study. A student suspended twice for poor scholarship ill not be readmitted.

ESIDENCE

minimum of 30 semester hours, including at least 12 hours in the major field, ust be completed while registered in the School of Public and International ffairs. This requirement applies to students transferring within the University s well as to students transferring from other institutions. Unless special perission is granted by the Dean to pursue work elsewhere, the work of the enior or final year must be completed in the School of Public and International affairs.

SE OF CORRECT ENGLISH

ny student whose written or spoken English in any course is unsatisfactory ay be reported by the instructor to the Dean. The Dean may assign supplentary work, without academic credit, varying in amount with the needs of e student. If the work prescribed is equivalent to a course, the regular tuition e is charged. The granting of a degree may be delayed for failure to make up y such deficiency in English to the satisfaction of the Dean.

TUDY ABROAD

udents wishing to study abroad must consult with their advisers and the Dean, ecause arrangements must be made on an individual basis. Students should ceive the Dean's approval, in advance, for their plan of study abroad if they an to have the credits earned abroad apply to the degree program they are gistered for in this School. A catalogue or other description of the foreign stitution or study program should be presented for consideration together th detailed descriptions of the courses to be taken. Students of international fairs are encouraged to travel and study abroad.

ORRESPONDENCE AND HOME-STUDY COURSES

redit for correspondence or home-study courses is not acceptable and cannot applied toward a degree.

CURRICULUM REQUIREMENTS

To be recommended by the Faculty for graduation, candidates are req
complete, in addition to the appropriate freshman and sophomore w
pages 82–83), a minimum of 60 semester hours during the junior an
years, as set forth in one of the following curricula.

EARNING CREDIT OR WAIVING REQUIREMENTS BY EXAMINATION

For information on earning credit or waiving curriculum requireme
Columbian College of Arts and Sciences, pages 76–77.

CHINESE LANGUAGE AND LITERATURE

See the Department of East Asian Languages and Literatures (page 2
the requirements for the Bachelor of Arts degree with a major in
Language and Literature.

Students in the Chinese Language and Literature program may avail
selves of a junior year abroad, as in the Chinese Studies program (see

CHINESE STUDIES

The Chinese Studies program is designed to introduce the student to
Western culture and to provide an understanding of the history, politics
economy of modern China. The program is interdepartmental and is
mended for students who wish a comprehensive study of one of the
major civilizations and for those who contemplate graduate study in
or Far Eastern Affairs.

In addition to 22 semester hours of Chinese language (ordinarily tak
the freshman and sophomore years), Chinese Studies majors must com
18 semester hours of required core courses and 24 hours in one area
centration selected from Economics, History, or Political Science.

A junior year abroad is available in this program of study. Interested
dents should contact the Acting Chairman of the Department of East
Languages and Literatures.

INTERNATIONAL AFFAIRS

The International Affairs program covers international political relations
national economics, international communications, and regional studies
addition to the introductory courses, including foreign language study
the third year, all International Affairs majors must complete 21 semester
of advanced courses and 15 hours of course work to be selected from
the following group options:

Group I: International Politics.—Courses concerned with theory and
tice in international affairs, forces shaping the world scene, and America
eign policy.

Group II: International Economics.—Courses concerned with the
economy and American policy and practice in international trade and

Group III: International Communications.—Courses concerned with the udy of international information programs, public opinion, psychological rfare, cultural relations, and public relations.

Group IV: Regional Study.—Integrated programs of study on Europe, Africa, e Middle East, the Far East, the Soviet Union and East Europe, or Latin merica.

PUBLIC AFFAIRS

he Public Affairs program is a composite curriculum dealing with domestic overnment and policy.

All Public Affairs majors must complete 24 semester hours of advanced ourses, foreign language study through the second year or 12 semester hours f Statistics, and 12 semester hours of course work to be selected from one of he following categories—economics, politics, or urban affairs.

The Degree of Master of Arts

HIS SCHOOL OFFERS PROGRAMS leading to the degree of Master of Arts in the major fields of International Affairs; Latin American Studies; Public Affairs; Russian Studies; and Science, Technology, and Public Policy.

ADMISSION REQUIREMENTS

Application forms are available from the Graduate Admissions Office, School of Public and International Affairs, George Washington University, Washington, D.C. 20006.

A Bachelor's degree from an accredited college or university, with a *B* average or better, or the equivalent, in the relevant undergraduate major, is required. If there is evidence of special promise, such as high GRE scores, an applicant whose academic record falls short of *B* will be given serious consideration. Scores on the Aptitude Test of the Graduate Record Examinations as well as letters of recommendation are required.

In International Affairs.—The applicant's undergraduate program should include background courses corresponding to an undergraduate major in International Affairs at this University or a strong disciplinary program with an international affairs orientation.

In Latin American Studies.—The applicants undergraduate program should include background courses corresponding to an undergraduate major in Latin American Studies at this University, or equivalent. Majors in other fields may be considered for admission provided their undergraduate record includes Spanish or Portuguese and sufficient course work in three of the following six areas: Anthropology, Economics, Geography and Regional Science, History, Political Science, and Hispanic Literature.

In Public Affairs.—The applicant's undergraduate program should include background courses corresponding to an undergraduate major in Public Affairs at this University.

In Russian Studies.—An undergraduate major in a pertinent field is required. The undergraduate program should have included the following courses or equivalent: Hist 145–46; P Sc 112 or 161; Slav 1–2 and 3–4, or 5–6.

In Science, Technology, and Public Policy.—Undergraduate majors in the social, life, or physical science, or in engineering are eligible for admission, although those lacking adequate preparation in relevant social sciences may be required to take additional courses.

READMISSION

A graduate student who has not maintained continuous registration and has not registered for one or more semesters must file an application for readmission. Applications for readmission are reviewed by the Dean and the Committee on Admission.

GENERAL REQUIREMENTS

There are two options available for the Master of Arts degree. One requires a minimum of 24 semester hours of approved graduate course work plus the successful completion of a thesis; the student must register for 6 semester hours of *Thesis Research* (299–300). The second option requires a minimum of 30 semester hours of graduate course work and does not include a thesis. The course work for both options is taken in preparation for the Master's Comprehensive Examination.

Master's degrees are awarded by vote of the Faculty after the student has completed the required course work and an acceptable thesis (if one is elected), has satisfied the foreign language or tool requirement, and has passed the Master's Comprehensive Examination. An applicant whose background does not include the necessary courses or equivalent work experience must take a program longer than the minimum hours required.

Under special circumstances second-group courses (numbered 101–200) may be counted toward the Master's degree when registration for graduate credit has been approved at the beginning of the course by the curriculum adviser, the instructor, and the Dean. The student who takes an undergraduate course for graduate credit is expected, by arrangement with the instructor, to do work at the graduate level in addition to the regular work of the course. Normally no more than 6 semester hours of second-group courses may be taken for graduate credit in the 30-semester-hour program, and no more than 9 semester hours may be taken for graduate credit in the 36-semester-hour program. No work counted toward a Bachelor's degree may also be counted toward a Master's degree.

All work for a Master's degree must be completed in five years, unless an extension of time is granted by the Dean.

No credit is granted for work done *in absentia* or without formal instruction, except for the thesis, which may be completed *in absentia* with the permission of the curriculum adviser and the Dean. No more than 6 semester hours of graduate credit may be transferred from other accredited institutions or another division of the University, and these may be accepted only under limited conditions of time, grades, and relevance to the student's program.

lent who expects to continue his studies for the degree of Doctor of hy in the field of International Relations after receiving the Master's de- he field of International Affairs is strongly advised to plan from the g so that work for the lower degree will fit into a subsequent doctoral in the Graduate School of Arts and Sciences (see pages 93–97, 100–

EQUIREMENTS

programs of study a candidate for the degree of Master of Arts must t he has a reading knowledge (certified by the appropriate language nt) of at least one modern foreign language, to be approved by the Master's degree candidate whose native language is not English may t his native language to meet the tool requirement; he may select o fulfill this requirement with the approval of his adviser and the he examination is administered by the Department of English.

lates in the field of Public Affairs and in the field of Science, Tech- nd Public Policy may substitute statistics for a foreign language. Ac- Statistics courses are Stat 49, 117, 118, and 121.

lates in the field of International Affairs may petition the Dean to statistics for a foreign language. The primary basis for approving itions will be the relevance of the statistical skills to the student's search.

nguage or tool examination should normally be taken before the as completed the first 15 hours of his work. No student may take the ion more than three times.

s taken to fulfill the tool requirement are not counted in the semester- uirement for a Master's degree.

'S COMPREHENSIVE EXAMINATION

on to any course examinations, the candidate must pass a written Mas- nprehensive Examination. Examinations are scheduled twice a year n November and April), and should be taken during the last semester registration or shortly after the completion of the prescribed course there is a lapse of time between completion of course work and the ion, the student must maintain "continuous registration" during this he candidate must consult with his adviser, well in advance, as to the is examination and the definition of the subject-matter fields which ination is to cover. An oral examination on his thesis or major report be required.

RSHIP

or graduate work are *A*, excellent; *B*, good; *C*, minimum pass; *F*, fail; lete; *W*, authorized withdrawal; and *CR*, credit.

erage of *B* or better is required for the Master's degree. The grade of considered as failing but must be counter-balanced by a grade of *A* in e course of equal status.

ter's candidate who receives a grade of *F* is required to present cause ideration by the Dean's Council as to why he should be allowed to con- studies.

Whenever a grade has not been assigned, the symbol *I* (incomplet
symbol *W* (authorized withdrawal) will be recorded. The symbol *I*
that a satisfactory explanation has been given to the instructor for the
failure to complete the required work of the course. An "incomplete
be made up after the lapse of one calendar year except by written p
of the Dean's Council. An incomplete which is not removed within
endar year is automatically changed to an *F*. An incomplete canno
moved by reregistering for the course.

THE THESIS

The thesis subject should be selected as early as possible so as to perm
tive integration with the course work.

The subject must be approved by the student's adviser and the mem
the Faculty under whom the thesis is to be written. The thesis in its fin
must have the approval of the thesis director *and one other reader* and
presented to the Dean by the student no later than the date announced
calendar. Printed copies of detailed regulations regarding the form an
duction of the thesis are available in the Office of the Dean.

Payment of tuition for the thesis entitles the candidate, during the pe
registration, to the advice and direction of the thesis director and the
reader. In case a thesis is unfinished, an additional calendar year m
granted without further tuition payment. The student must, however, m
continuous registration (see page 49) during this period. If the pres
of the thesis extends beyond the additional calendar year, the studen
register for the entire 6 hours of thesis again and pay tuition as for a n
course.

INTERNATIONAL AFFAIRS

Prerequisite: the applicant's undergraduate program should normally
a broad background of courses corresponding to the interdepartmental
graduate major in International Affairs at this University (see page
or some equivalent interdisciplinary social science program. In the ca
major deficiencies in the social sciences or international relations, add
course work may be specified beyond the minimum requirements for the
ter's degree. The student's particular responsibilities will be indicated
letter of admission to the program and in the course of subsequent co
tion with a program adviser, who will be assigned and with whom the
is required to confer.

Students who elect the program of study which includes a thesis must
plete 24 semester hours of third-group courses (numbered above 200)
Thesis Research (299–300) which is equivalent to 6 additional semester ho
Students who elect the program of study without a thesis must comple
semester hours of third-group courses (numbered above 200).

In addition to the satisfactory completion of his courses and the thesis
one is elected) the student must pass a set of written examinations over
fields (if a thesis is elected) or four fields (if a thesis is not elected) within
broad area of international affairs. These fields must represent at leas
disciplines.

raduate courses should be selected, in consultation with the adviser, with a to their relevance to the fields in which the student expects to be exam- Course work should be understood to be only partial preparation for the examinations, and the student is expected to pursue a program of addi- al reading in each of his fields, in accordance with the advice of the Faculty mber responsible for instruction in the field.

The program in International Affairs offers three broad areas of study: gen- supplementary or special, and regional. At least one general field must included in the three fields the student selects. Graduate courses in anthro- ogy, business administration, economics, history, political science, psy- logy, and sociology relate to these fields of specialization.

General Fields of Study.—International Politics, Comparative Government Politics, Modern Political Theory (including Socialist and Communist eory), and International Economics.

Supplementary or Special Fields.—International Law, International Organiza- n and Administration, International Economic Development, International mmunications, International and Comparative Aspects of Communism, U.S. plomatic History, U.S. Foreign Policy; and Science, Technology, and Public licy.

Regional Fields.—Modern history, or government and politics, or economic lory and problems of Western Europe, Eastern Europe, Soviet Union, Latin erica, Middle East, Africa, South and Southeast Asia, and China.

Sino-Soviet Studies.—The Institute for Sino-Soviet Studies provides a pro- m of interdisciplinary study concerned with the problems of Russia, the viet Union, East Asia, and Eastern Europe, and related aspects of interna- al communism. Graduate studies under the auspices of the Institute are ilable to qualified students (see pages 317-18).

LATIN AMERICAN STUDIES

pages 389-90 for the program of study leading to the degree of Master of s in the field of Latin American Studies.

PUBLIC AFFAIRS

equisite: an undergraduate major in public affairs, economics, history, or ical science, depending upon the field of specialization. Any course de- ncy in the undergraduate Public Affairs curriculum, as stated on page 388, t be made up.

he tool requirement (see page 169) must be satisfied.

he program in Public Affairs is offered in two fields of specialization: do- ic economics and domestic politics.

ecommended for domestic economics: courses in economic development, omic policy, public finance, and national income.

ecommended for domestic politics: courses in U.S. social, constitutional, political history; comparative government; political theory; the American dency; legislative organization; jurisprudence; political parties; and public on.

RUSSIAN STUDIES

Prerequisite: an undergraduate major in a pertinent field. The under program should have included appropriate courses in history, political and Russian language (see page 390).

The student's program of study is planned in consultation with an and the 24 semester hours (if a thesis is elected) or 36 semester hou thesis is not elected) of course work (see page 390) include courses nomics, geography, history, or political science, and Russian culture o literature. The student must pass a general written examination. If he ing a thesis (equivalent to 6 semester hours), it must be interdisciplı approach. The tool requirement must be satisfied by passing a reading edge examination (certified by the appropriate language department) foreign language, approved by the Dean.

SCIENCE, TECHNOLOGY, AND PUBLIC POLICY

Prerequisite: an undergraduate major in a social, life, or physical scien in engineering. Those lacking adequate preparation in relevant social may be required to take additional courses; such requirements will be in in the letter of admission to the program.

The student's program of study (see page 390) is flexible and is c planned and conducted in consultation with an adviser. The program w three (or four) fields of study. One will be the core field of science, tec and public policy, with 9 hours of required courses. A second will fo the fields currently offered in the international affairs or public affairs pr of the School. The third field (and/or fourth field) may also be chosen currently offered field, or one or both may be an interdisciplinary field de in consultation with the adviser and drawing upon the total resources University in order to focus on a particular policy issue or area. Such a field must be approved by the student's adviser and the Dean.

Each student must pass written comprehensive examinations in his fie study. The language or statistics requirement (see page 169) must be

Institute for Sino-Soviet Studies

GRADUATE STUDY AND RESEARCH ON EASTERN EUROPE, RUSSIA THE SOVIET UNION, AND EAST ASIA

THE INSTITUTE FOR SINO-SOVIET STUDIES provides a program of spec graduate study and research within the School of Public and Interna Affairs. Courses of the Institute are drawn from a variety of academic and thus provide an interdisciplinary approach to the study of Russia an Soviet Union, Eastern Europe, and East Asia, and of the Communist ment within and among the countries of these areas. Faculty members seminars and reading courses in the disciplines of economics, geography, language and literature, law, political science, and psychology.

The Institute provides Master's and Doctoral candidates with the opportunity combine a course program of Sino-Soviet Studies with the work in their own ciplines.

Students who are preparing for the degree of Master of Arts in the field of ernational Affairs in the School of Public and International Affairs, or for degree of Master of Arts in the field of Economics, History, or Political ence in the Graduate School of Arts and Sciences, with specialization in o-Soviet Studies, may take one-half of their course work from the Institute's gram.

Students working toward the degree of Doctor of Philosophy in International lations with special emphasis on the Sino-Soviet area are expected to com- e work in the Institute with work in the fields of economics, history, and litical science. Doctoral candidates in the field of Political Science will offer ir Sino-Soviet work in the form of appropriate sub-fields of the major and inor fields. Doctoral candidates in the field of History are expected to take at ast two of the four fields of the degree in the history of the countries of their ecialization. All work leading to the degree of Doctor of Philosophy is under e general supervision of the Graduate School of Arts and Sciences and Con- ltative Committees designated by that School which direct the work of each aduate student upon admission to degree candidacy. A faculty member of the stitute will serve as adviser to the candidate. The candidate's committee will be rmed from members of his disciplinary department. A candidate for such a gree should assume that his committee will require the substitution of a ading examination in Chinese or Russian for one of the two Western lan- ages normally required for the degree.

SEARCH

search work is integrated with the teaching program. Members of the re- arch program belong to different disciplines and include not only faculty but so selected graduate students. Research monographs are being published by e Institute.

A special brochure describing in more detail the work of the Institute is ailable upon request.

TERUNIVERSITY RESEARCH COLLOQUIA

holars from George Washington University, American University, Howard iversity, the School of Advanced International Studies of Johns Hopkins iversity, and the University of Maryland conduct two interuniversity re- rch colloquia. The Colloquium on Modern China is under the chairmanship Professor Franz Michael; the Colloquium on Russia and Eastern Europe is der the chairmanship of Professor Andrew Gyorgy. Research in progress by mbers of the colloquia and plans for future research are discussed at weekly etings. Advanced graduate students can be admitted on approval of the irman concerned. They receive 3 semester hours of academic credit for h semester of participation, which includes preparation of written work their own.

War College Programs

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS offers off-campus programs at the National and the Naval War Colleges leading to the degree Master of Science in International Affairs. Admission is limited to selected members of the faculty and student bodies of these two War Colleges.

The programs of study are complementary to those portions of the War Colleges' curricula pertaining especially to international relations and foreign policy.



A Student at the Library of Congress

DIVISION OF UNIVERSITY STUDENTS

Dean J.G. Allee, Jr.
Assistant Dean Jean Wuckovich

DEAN'S COUNCIL*

J.G. Boswell, A.H. Desmond, Hewitt Kenyon, J.A. Morgan, Jr.

INTRODUCTION

HE DIVISION OF UNIVERSITY STUDENTS was established in 1930 to make the egular course offerings of the University more generally available to members f this metropolitan community and to others who are not at the time candiates for degrees in this University. In this Division are registered students ho wish to undertake university courses for credit or as auditors. University tudents, often employed in government or industry, may be taking courses to ncrease their vocational fitness or to inform themselves on new developments in he arts and sciences. They may be taking courses as a matter of personal inrest for cultural enrichment. Such students may be candidates for higher egrees in other institutions, sent here for special work as part of a graduate rogram. They may be undergraduates, matriculated in other colleges, taking ummer sessions courses only or courses for transfer during the regular acaemic year with the approval of their own institution. They may be students rom institutions outside the Washington metropolitan area enrolling in an apropriate "Washington Semester" program. To serve members of such groups nd others not enrolled in degree-granting branches of the University is the unction of the Division of University Students.

The privilege of attending George Washington University as a nondegree udent is granted on the basis of maturity and proper preparation. Because o degree at George Washington University is involved, there can be no meangful advisory system in the Division. However, students are invited to seek dvice from academic departments. University students are urged to apply to he Office of Admissions for transfer to degree-granting branches whenever uch action is appropriate.

All courses except those restricted to medical and law students and those limed to specific degree candidates are open to students in the Division of Uniersity Students. Students wishing to take Engineering and Applied Science ourses should consult the *School of Engineering and Applied Science* Cata-

*The Vice President for Academic Affairs, the Dean and the Assistant Dean of the Division are officio members of the Council.

Registration in a given course may be denied students in this Division space is needed for degree candidates.

An applicant who has been denied admission to any degree-granting of the University will not be considered for admission to the Division versity Students for the semester for which the applicant was denied, upon written recommendation of the dean of the college or school that the applicant. However, an applicant who has been denied may be cons in subsequent semesters.

ENTRANCE REQUIREMENTS*

Good character and an academic background appropriate for the progr studies contemplated are required.

A person not working for a degree at this University will be considere admission to the Division of University Students to take courses for wh has adequate preparation, as determined by the departments concerned.

Although the deadline for applications for admission to the Division versity Students is the Friday before the first day of registration (see 7, 8), applicants are urged to apply earlier because no special exceptions made to permit registration for credit after the last day for adding classe page 177) even though the requiring of credentials, records, and test may delay the action on an application for admission. Subject to the p sion of the department concerned, the deadlines for late registration, a dropping, and withdrawal do not apply to auditors.

Scholastic records are required of

1. An applicant who has graduated from high school within the previous calendar years. Such an applicant must pass designated aptitude tests or the following requirements, which are the same as those for admission to lumbian College of Arts and Sciences and the School of Government Business Administration.

   a) An acceptable certificate of graduation from an accredited secon school, showing at least fifteen units† which must include four years English; at least two years of one foreign language; two years of scien preferably with laboratory instruction; two years of social studies, on which must be American history; and two years of college prepara mathematics. It is to be noted that one unit of algebra, or the equiva is prerequisite to courses in chemistry and statistics, and that one un algebra and one unit in plane geometry, or the equivalent, are prere site to courses in mathematics and physics.

   b) The principal's statement that the applicant is prepared to undertake lege work.

   c) College Entrance Examination Board scores on the Scholastic Apti Test and the English Composition Achievement Test.

2. An applicant who has been subject to any form of academic or disci nary action at any college or university within the previous calendar year.

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* Foreign students, see pages 27-28.

† A unit represents a year's study in a secondary school subject, including in the aggregate no than 120 sixty-minute periods, or the equivalent, of prepared classroom work.

3. High school students who are applying for the Secondary School Honors Program (see pages 178–79).
4. An applicant who has not completed high school or the equivalent. Such an applicant may be required to take assigned aptitude tests at the University Counseling Center.

Scholastic records may be required of

1. An applicant who has attended any college or university during the previous calendar year.
2. A former student of this University who was on probation or suspended and, since then, has attended another college or university.
3. An applicant who has *ever* been subject to academic or disciplinary action. When scholastic records are required, a student may be admitted for one semester or summer term only, pending receipt of records and under provisions stated by the Office of Admissions.

REGULATIONS

Regulations concerning ADMISSION, REGISTRATION, FEES AND FINANCES *are stated on pages 23–34; other University regulations, on pages 45–53.*

Prospective and registered students are urged to acquaint themselves with the regulations concerning "Attendance" (see page 45) and "Withdrawal" (see page 48).

The following specifically applies to all students in the Division of University Students:

Last day to add a class for credit—end of first week of classes.

Last day to drop a class for credit or withdraw from the University—last working day in March and last working day in November (the University work week is Monday through Friday). (See calendar for beginning date of classes, pages 7, 8.)

ACADEMIC WORK LOAD

The normal academic work load is not more than 10 hours for a student employed more than 20 hours a week and not more than 17 hours for a full-time student. Exceptions to these limits must be approved by the Dean.

SCHOLARSHIP

A student who fails to maintain the scholarship requirements of this Division may be dismissed from the University.

Normally, any course may be repeated for credit. All grades received in the Division of University Students remain on the record, and scholarship requirements are based on the total record. A course taken for audit may not be repeated for credit (see pages 48-49).

GRADES

Undergraduate.—*A*, Excellent; *B*, Good; *C*, Average; *D*, Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal.

Graduate.—For graduate work, grades are indicated as *A*, Excellent; Good; *C*, Minimum Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal

The "credit/no credit" option, which permits students to take courses which they receive the grade of either "Credit" or "No Credit," is not availa to students registered in the Division of University Students.

PROBATION AND SUSPENSION

A student taking courses for undergraduate credit is subject to the same "Pr bation" and "Suspension" regulations as those of Columbian College of Ar and Sciences (page 74).

A student taking any courses for graduate credit must maintain a cumula tive quality-point index in these courses of 3.00 or the equivalent. If in 1 hours or more of graduate credit the cumulative (graduate) index falls belo 3.00, the student will be placed on probation. If in 12 hours or more of gradu ate credit, the cumulative (graduate) index falls to 2.25 or below, the studen will be suspended.

A student taking (or having taken) some courses for undergraduate credi and taking (or having taken) some courses for graduate credit will be con sidered on probation if the standards stated above are not maintained in eithe undergraduate or graduate work. Similarly a student suspended from under graduate or graduate work is suspended from all work in the Division.

A suspended student will not be permitted to audit a course in the Divisio during the period of suspension.

CHANGES IN PROGRAM OF STUDIES

Changes within the Division of University Students.—A student may not change or drop courses (see "Withdrawal," page 48) or change his status to that of auditor except with the approval of the Dean.

Change from one section to another of the same course may be made with the approval of the Dean and the department concerned.

Transfer within the University.—Transfer to or from the Division of University Students may be made only with the approval of the deans concerned.

Application for transfer to degree candidacy will be considered only after the completion of at least one semester in the Division of University Students or upon request from the college or school to which the student is seeking admission.

The student wishing to transfer to degree candidacy must meet the conditions of the college or school to which he is applying. It is the responsibility of the student to consult the relevant degree-granting college or school concerning all conditions to be met and the amount of work transferrable.

SECONDARY SCHOOL HONORS PROGRAM

The outstanding secondary school student in the Washington metropolitan area who wishes to enrich his academic background and participate in stimulating college work is encouraged to seek admission to the George Washington University's Secondary School Honors Program. The Honors Student is enrolled in regular college courses of his own choosing appropriate to his level of study.

his background, and his aptitude as determined through consultation with his high school counselors and advisers at the University.

Credit earned in the Program is applicable toward a degree at George Washington University should the student later matriculate here. The transfer of credit elsewhere depends upon the policies of the individual schools to which the student might later apply.

Admission to the Honors Program is highly competitive. Normally, only 15 students a semester will be admitted to this Program, and each student will receive a scholarship totaling 50 per cent of his tuition (excluding laboratory and University Center fees). Admission is for one semester only, but students doing well will be given preference for continuation and may be readmitted for a second semester. Criteria for admission are based on a transcript of the student's grades to date, available test scores, evidence of emotional and intellectual maturity, and the results of the interview with the Director.

Application forms and further information may be obtained from Mrs. Jean G. Wuckovich, Director of the Secondary School Honors Program, Division of University Students, George Washington University, Washington, D.C. 20006. No applications will be considered after the Friday before the final day of registration for the semester concerned. For application for the summer session see the *Summer Sessions Catalogue*.



THE SUMMER SESSIONS

Dean C.W. Cole
Assistant Dean Lawrence Winkler

DURING THE SUMMER OF 1972, Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Government and Business Administration, the School of Public and International Affairs, the School of Engineering and Applied Science, and the Division of University Students offer courses in two 5-week sessions. The School of Engineering and Applied Science also offers courses in an 8-week period. The National Law Center offers courses in two 6-week sessions and one 13-week session; the School of Education offers courses in a 6-week session and three 3-week workshop sessions. In addition, a carefully planned group of special programs will be offered to serve a variety of student needs.

For a complete statement concerning summer-term work, see the *Summer Sessions Catalogue*.



OFFICE OF THE VICE PRESIDENT FOR POLICY STUDIES AND SPECIAL PROJECTS

Vice President L.H. Mayo

THE VICE PRESIDENT for Policy Studies and Special Projects is responsible to the President of the University for developing a multidisciplinary University capability for analyzing national policy issues, with involvement by the Consortium universities, foundations, federal agencies, industry, and other organizations having interaction with the governmental process.

Working closely with the Vice President for Academic Affairs, the Vice President for Policy Studies and Special Projects assists in developing faculty research capability for policy studies, recommends the introduction of new curricula in the policy analysis area—in particular at the postgraduate and advanced professional levels—and provides a continuing appraisal of the public advisement function of the University. The Office of the Vice President for Policy Studies and Special Projects serves the University as the locus for discussion and as an advisory resource on interdepartmental and interdisciplinary research related to the analysis of public policies and on curricula pertaining to broad social or environmental problems, in which a number of departments and schools participate.

This Office is responsible for coordinating activities of the Program of Policy Studies in Science and Technology with other policy-oriented projects and programs within the University.

PROGRAM OF POLICY STUDIES IN SCIENCE AND TECHNOLOGY

The primary objective of the Program of Policy Studies in Science and Technology is to encourage the continuing development of a University policy research capability directed toward the complex issues confronting society. As an integral part of the University, the Program undertakes to serve as an organizing element and to provide a neutral forum for the discussion of policy issues—current and prospective—by representing community groups, and as an advisory and research resource for policy makers in both public and private sectors.

Activities of the Program reflect a number of ways in which a wide range of interdisciplinary talents can be brought to bear upon the analysis of policy problems, particularly those involving the impact of advancing technology on the processes, values, and institutions of society.

By means of the Program of Policy Studies in Science and Technology, George Washington University is moving toward an institutional approach to the policy analysis function as contrasted with the highly fragmented and largely uncoordinated pattern of "institutes," "centers," and "study groups"

which exists at most universities. The Program of Policy Studies concept is novel in its attempt to provide an organization that strengthens the University's ability to address itself to broad issues of public policy. This approach envisages a continuing interaction among the professional staffs of the Program of Policy Studies in Science and Technology, other policy research groups, and other faculty members of the schools and departments of the University.

The following are the primary study areas of the Program:

1. The structure and functions of institutions designed to stimulate, utilize, regulate, and appraise the application of science and technology to the achievement of basic community goals, and to society's needs, national and international.

2. The application of modern research and development management concepts and skills to the planning, programming, and managing of governmental programs and urban social problem areas.

The Program has also undertaken to bring into focus the courses and seminars offered by the University which are directly related to the interface area of science, society, and public policy. An announcement is published every Fall.

The Program supports or conducts a number of activities, including studies, monographs, special reports, and professional seminars with government, industry, policy research, and university representatives. An Annual Report of current activities is published in the Fall.

Funding sources for the Program of Policy Studies in Science and Technology include, in addition to the University, a basic institutional grant from NASA and grants and contracts from other sources such as the Environmental Protection Agency, the Federal Highway Administration (Department of Transportation), the Office of Education and the Public Health Service (Department of Health, Education, and Welfare), the Department of State, the Department of Housing and Urban Development, the Russell Sage Foundation, the National Science Foundation, the Ford Foundation, and the Cogar Foundation.

PROFESSIONAL STAFF*

Director: Louis H. Mayo, *Vice President for Policy Studies and Special Projects; Professor of Law*

James G. Abert, *Senior Research Scientist (Economics, Engineering, Systems Analysis)*

Betsy Amin-Arsala, *Research Associate (Political Science)*

Dorsey A. Baynham, *Research and Editorial Associate, President's National Advisory Council on Supplementary Centers and Services (Educational Policy Group)*

Karen Bell, *Research Assistant, Educational Policy Group (Linguistics)*

Guy Black, *Senior Staff Scientist; Professor of Business Economics*

Jennifer Bond, *Research Assistant (Science, Technology, and Public Policy)*

Henry Brady, *Research Associate (Physics, Mathematics, Theology)*

Jerome B. Brightman, *Research Associate, President's National Advisory Council on Supplementary Centers and Services (Educational Policy Group)*

James M. Brown, *Director, Land Use Project; Professor of Law*

* Staff listing consists of members who allocate all or a substantial portion of their effort to Program activities. Directors and members of the staffs of other policy study groups in the University also participate in the various seminar series, conferences, and other activities of the Program.

Susan K. Coady, *Research Assistant (Science, Technology, and Public Policy)*
Vary T. Coates, *Research Scientist; Director, Technology and Public Policy Project*
Deborah Cobin, *Research Assistant; Cogar Foundation Fellow in Science, Technology, and Public Policy*
Susan L. Doscher, *Research Associate (Political Science)*
Steven Ebbin, *Senior Staff Scientist (Political Science)*
Richard F. Ericson, *Senior Staff Scientist; Director, Interdisciplinary Systems and Cybernetics Group; Professor of Management*
William A. Fischer, *Research Associate (Industrial Management)*
Joseph V. Foa, *Professor of Engineering and Applied Science*
Mark S. Frankel, *Research Assistant; Cogar Foundation Fellow in Science, Technology, and Public Policy*
John E. Fredland, *Research Associate; Assistant Professor of Economics*
Joel A. Garner, *Research Assistant (Political Science)*
Philip A. Graham, *Research Associate (Aeronautical Engineering)*
Harold P. Green, *Professor of Law; Director, Law, Science, and Technology Program*
John Hanessian, Jr., *Senior Staff Scientist; Director, International Studies Group*
Audrey Hassanein, *Research Information Specialist*
Kathryn Hensley, *Research Associate, Educational Policy Group (Education, Communications, Population Specialist)*
Guenther Hintze, *Research Professor of Electrical Engineering*
Mary A. Holman, *Associate Professor of Economics*
Rodney Huff, *Research Associate and James E. Webb Fellow in Science, Technology, and Public Policy*
Raphael G. Kasper, *Research Scientist (Nuclear Physics); Director, Technology Assessment Implementation Project*
Gerald J. Kluempke, *Executive Secretary, President's National Advisory Council on Supplementary Centers and Services (Educational Policy Group)*
John M. Logsdon, *Research Scientist (Science Policy); Assistant Professor of Public Affairs and Political Science*
Joseph B. Margolin, *Senior Staff Scientist; Director, Educational Policy Group*
William H. Marlow, *Director, Institute for Management Science and Engineering; Professor of Operations Research*
Milton C. Marney, *Senior Research Fellow, Project on Normative Systems Research; Integrative Basis for Urban Studies*
Marion R. Misch, *Research Scientist; Deputy Director, Educational Policy Group*
Mary Mogee, *Research Assistant (Science, Technology, and Public Policy)*
William B. Neel, *Research Assistant (Theology, Law)*
Howard C. Reese, *Consultant (Government)*
Erling F. Rosholdt, *Staff Member of Program in Logistics*
Marc Schieber, *Research Assistant (Science, Technology, and Public Policy)*
Corazon Siddayao, *Research Associate (Economics)*
Nozer D. Singpurwalla, *Associate Professor of Operations Research*
Stephen Somerstein, *Research Assistant (Law)*
Theodore Suranyi-Unger, Jr., *Senior Staff Consultant (Economics); Director, Standards of Living Project; Research Professor of Economics*

Joseph L. Tropea, *Director, Behavioral Systems Group; Assistant Professor of Sociology*
Robert Ware, *Research Assistant (Law)*
David C. Weeks, *Consultant (Information Science); Staff Member of Biological Sciences Communication Project*
Sherri Wolff, *Research Assistant, Educational Policy Group (Education, Communications)*
Frederick B. Wood, *Research Associate (Management)*
John J. Zimmerman, *Research Assistant (Law, Physics)*

ADVISORY COMMITTEE

Chairman: Lloyd H. Elliott, *President, George Washington University*
Vice Chairman: Bernard A. Schriever, *Chairman of the Board, Schriever & McKee, Inc., Washington, D.C.*
Harold F. Bright, *Provost and Vice President for Academic Affairs, George Washington University*
Arthur E. Burns, *Dean, Graduate School of Arts and Sciences, George Washington University*
Joseph L. Fisher, *President, Resources for the Future, Inc., Washington, D.C.*
Lawrence Levy, *President, Allied Research Associates, Concord, Mass.*
Dwight Waldo, *Albert Schweitzer Professor in the Humanities, Syracuse University*
Reuben E. Wood, *Professor of Chemistry, George Washington University*

INSTITUTE FOR EDUCATIONAL LEADERSHIP

Norman Drachler, *Director of the Institute for Educational Leadership*
Samuel Halperin, *Director, Educational Staff Seminar*
Michael O'Keefe, *Director, Washington Internships in Education*
Charles Taylor, *Assistant Director, Washington Internships in Education*

To meet the need for strengthening existing and potential leadership in American education at all levels of policy formulation and administration, George Washington University has established the Institute for Educational Leadership. The Institute's primary thrust is investment in actual and promising educational leaders through a series of experiences designed to provide first-hand exposure to and involvement with key issues confronting educational policy-makers. Emphasis is placed on improving the quality of the educational policy process.

The selection of promising and highly qualified individuals to take part in various activities is of crucial concern to the Institute. Criteria for selection emphasize performance in leadership situations. In carrying out its selection and training functions, the Institute is adaptive in its approach, continuously testing the efficacy of alternative methods of leadership development.

The objectives of the Institute are carried out under programs and activities of the following types:

1. The existing *Washington Internships in Education* program (WIE) with additional participation at several state levels. Each year WIE and its sponsors from public and private agencies bring together a group of young people from widely diverse backgrounds who share the goal of improving American education. WIE interns are given the opportunity to work and study for a year in

a unique and intensive learning environment. The program is designed to help them think in policy terms about national and state issues and their relationship to educational and human goals, to become more sophisticated in dealing with the processes of decision-making, and to become more familiar with the structures and procedures of large organizations.

2. The existing *Educational Staff Seminar* program (ESS) and the extension of activities at the state level. ESS is designed to assist professional staff members in the field of education, employed by both the executive and legislative branches of the federal government, in obtaining more realistic understanding of actual educational practices and problems, and to improve communications between Washington educational staff members and educators in the field. ESS seeks this increased staff understanding and awareness of contemporary problems in American education through a variety of in-service training seminars and in-the-field personal observations. Emphasis is on developing broad educational understanding and perspective and providing wide exposure to current educational problems.

3. *Institute Associates* are appointed from selected faculty and administrative staff members of institutions of higher education and staff members of other community organizations. They serve as technical advisers on educational policy development with congressional and state legislative committees, executive agencies, commissions and councils, and appropriate nongovernmental agencies. The program provides the various policy-makers with expert help in formulating proposals and gives Associates direct and immediate experience in the formulation of educational policy.

4. *Scholars-in-Residence*. A select group of individuals of national prominence and professional distinction are invited to occupy chairs of educational leadership development. Scholars act as advisers-in-residence to participants in the WIE, ESS, Associates, and other Institute programs and contribute to interdisciplinary areas of educational thought and leadership.

5. *In-service Training Activities*. The Institute also gives emphasis to continuing career development of educational leaders. In accord with this objective, the Institute is developing a continuing series of programs and activities for the benefit of educational leaders from various institutional settings in both the public and private sectors and from various levels of policy formulation, implementation, and administration. While major attention is focused on the national scene, every effort will be made to carry these programs of the Institute to regional and state levels.



SPONSORED RESEARCH

Assistant Vice President for Research C.J. Lange

THE RESEARCH PROGRAMS listed in this section are special programs which are established for the specific purpose of attacking in an academic atmosphere problems proposed by the individual projects or submitted by the sponsoring agency. Cooperation between these programs and the various departments of instruction is as close as the nature and needs of the programs and departments will permit.

BIOMETRIC LABORATORY

Director R.R. Bonato
Assistant Director J.J. McKeon

The Biometric Laboratory applies statistical techniques to pharmacological problems related to mental health. It was established under a contract with the National Institutes of Health. The laboratory assists investigators throughout the United States in planning research and in analyzing data. The majority of these research projects concern the effects of drugs on behavior.

CENTER FOR MANPOWER POLICY STUDIES

Director Sar Levitan

The Center for Manpower Policy Studies is devoted to the evaluation of federally-supported manpower, antipoverty, and related programs. The Center is financed by a grant from the Ford Foundation and offers in conjunction with the Department of Economics graduate courses in labor economics and manpower policy.

EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) CLEARINGHOUSE ON HIGHER EDUCATION

Director C.J. Lange
Associate Director B.B. Breedin

The Educational Resources Information Center (ERIC) Clearinghouse on Higher Education was established in the Fall of 1968 with the support of the U.S. Office of Education; it is the nineteenth in a national network of education information centers. The Clearinghouse is responsible for the acquisition, evaluation, abstracting, indexing, and dissemination of research reports and other documents dealing with problems and issues in the field of higher education. It also prepares state-of-the-art and review papers related to higher education.

INSTITUTE FOR MANAGEMENT SCIENCE AND ENGINEERING

Director W.H. Marlow

The Institute for Management Science and Engineering provides a multidisciplinary environment for innovative graduate teaching and substantial opportunities for research activities and public service under diversified sources of external support.

The Institute works closely with the University's Program of Policy Studies in Science and Technology in the application of developing technologies to contemporary problem areas. Through its Program in Logistics, the Institute performs research leading to the development of a science in logistics featuring principles and methodology for resource allocation problems in civil affairs and national defense efforts.

MID-ATLANTIC REGION SPECIAL EDUCATION INSTRUCTIONAL MATERIALS CENTER

Director R.S. Cottrell, Jr.
Assistant Directors Robert R. Carter, Carol J. Gross

The Mid-Atlantic Region Special Education Instructional Materials Center (MAR-SEIMC) was established in March, 1967, by the Bureau for Education of the Handicapped, U.S. Office of Education, and George Washington University to collect, organize, and disseminate information and materials about and for the instruction of handicapped children and youth. Providing assistance in the development of similar centers throughout the Mid-Atlantic Region (Delaware, the District of Columbia, Maryland, New Jersey, Pennsylvania, and Virginia) is a major activity. Workshops are conducted both in the Center and in the field. MAR-SEIMC is part of a national network of similar centers.

NATURAL RESOURCES POLICY CENTER

Director Mary Holman

The Natural Resources Policy Center was established in September, 1965, to sponsor faculty and student research in the area of natural resources and environmental quality; to develop and undertake activities that promote undergraduate and graduate education; and to train employees of public resource agencies. The program of the Center focuses particularly on increasing the contribution of the social sciences—economics, planning, and the political institutions of natural resource agencies—so that these disciplines and related fields of knowledge may be brought to bear more fruitfully on contemporary problems relating to the management and development of natural resources. The Natural Resources Policy Center, which provides a focus on natural resource and environmental quality problems and issues, is an integral part of the Department of Economics in both the design of its research program and its courses.

OPERATIONAL AND DEMOGRAPHIC ANALYSIS FOR MATERNAL AND CHILD HEALTH CARE PROJECT

Director R.R. Bonato
Co-director and Principal Investigator Margaret Pratt

This project is concerned with computer-supported research into the maternal

and child mortality and prematurity levels of the United States and the socio-economic and health-facilities factors which affect these levels. In addition to this research, the project designs and implements informational and evaluative studies of interest to the sponsoring agency. As part of this effort, the project publishes a periodical called the *MCH EXCHANGE*, which contains the results of the project's research and other material of interest to persons concerned with material and child health. The project is now concerned with an investigation of the basic structure and standards essential to Health Program Management Information Systems. This project is operated under a grant from the Maternal and Child Health Service, Health Services and Mental Health Administration, Department of Health, Education, and Welfare.

SOCIAL RESEARCH GROUP

Director I.H. Cisin
Associate Director H.J. Parry

The Social Research Group conducts surveys and experiments with concentration on basic research underlying an approach to the solution of social problems.



OFFICE OF PROGRAM DEVELOPMENT

Director, C.C. Mondale

FOR THE LAST SEVERAL YEARS the University has been committed to the continuous development of new courses and innovative teaching methods. This experimental program has had two major goals: to relate classroom instruction more closely to problems of modern urban life and to make the resources of the University more useful to the surrounding metropolitan community.

The Office of Program Development was established in July, 1971, to expand and to coordinate developmental activities throughout the University. It sponsors courses which do not readily fit into the curricula of existing departments or schools. A large number of undergraduate and graduate students, faculty, and administrators throughout the University are involved in planning, teaching, and evaluating new courses under the auspices of this Office.

The Office has developed a number of Experimental Humanities courses, most of which provide opportunities for students to combine sustained field-study with classroom work. These courses are taught by interdisciplinary faculty teams.

A new Service-Learning Program permits students to earn academic credit for the satisfactory performance of work-study assignments in community groups, research organizations, or government agencies. Work-study assignments are arranged by means of a formal agreement among the student, the Program, and the off-campus agency. The student earns from 3 to 15 semester hours of credit, depending upon the nature of the assignment.

Those programs in curriculum development which are designed specifically to be of direct service to the Washington community are sponsored by a section of the Office of Program Development known as the GW-Washington Project. Among the activities of the Project is a technical assistance program in the Congress Heights neighborhood, co-sponsored by the United Planning Organization. The Project, in conjunction with the Spanish Education Development Center, places bilingual students in the Washington, D.C., Spanish-American community. A Community Leadership Development Program makes available short-term tuition support for community leaders and offers stipends to selected students for work in community agencies.

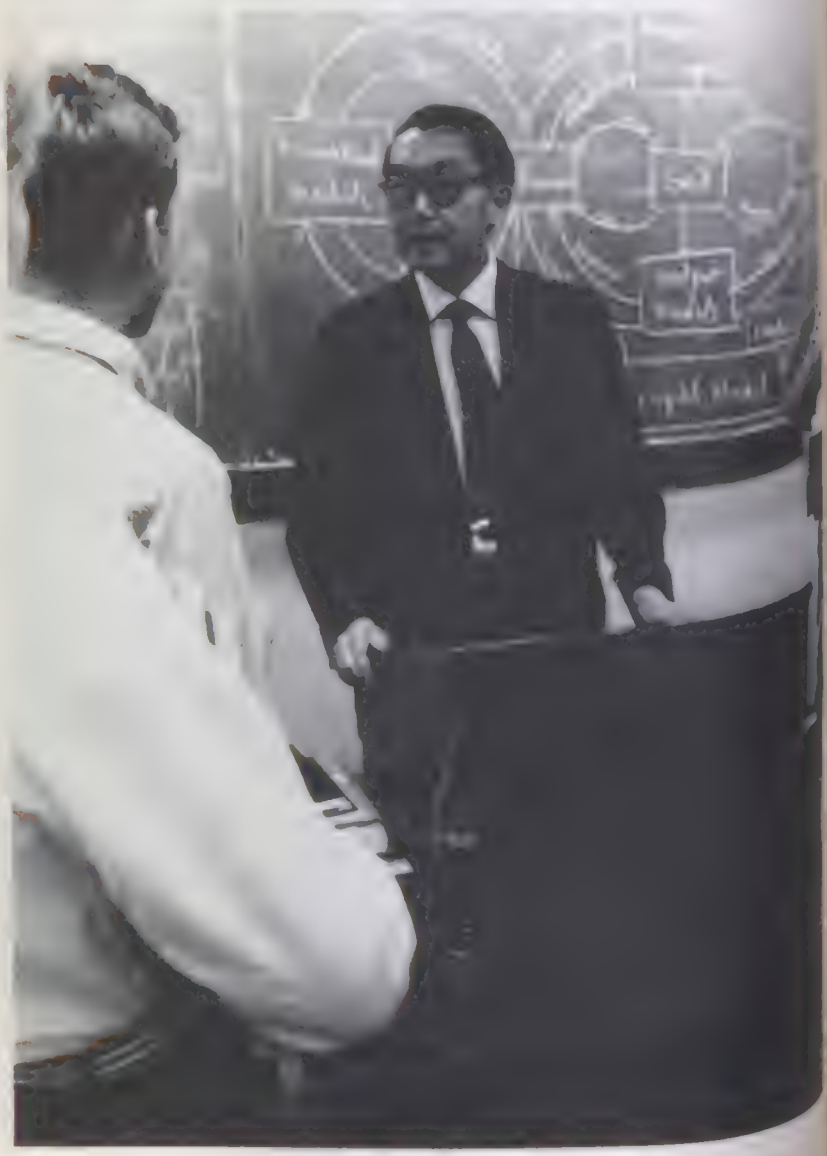
The Office of Program Development is funded through grants from the Richard King Mellon Charitable Trusts and from the National Endowment for the Humanities, as well as from general funds of the University.

ASSOCIATES

Augustus Edwards, *Project Coordinator, G.W. Washington Project*
Roderick French, *Program Coordinator, Humanities Development Program*
Robert E. Cannady, Jr., *Director of Community Relations*

STEERING COMMITTEE

Harold F. Bright, *Provost and Vice President for Academic Affairs, Chairman*
Marcella Brenner, *Professor of Education*
Jacqueline Goodnow, *Professor of Psychology*
Guenther Hintze, *Research Professor of Electrical Engineering*
Henry Solomon, *Professor of Economics*
Philip Birnbaum, *Consultant to the Provost*
William D. Johnson, *Director of the Budget*



COURSES OF INSTRUCTION

ON THE FOLLOWING PAGES OF THIS CATALOGUE, under the alphabetically arranged names of the departments of instruction and special interdepartmental programs, are listed the courses of instruction offered by the University in the academic year 1972-73. The courses as here listed are subject to change. The University reserves the right to withdraw any course announced.

HOURS OF INSTRUCTION

Classes are scheduled in the morning, afternoon, and evening. Evening and daytime sections of the same course are identical, are taught by the same staff of instructors, and carry the same amount of credit. By taking the evening and summer classes and extending the time of study beyond the usual four years, a part-time student may complete the requirements and obtain a degree.

EXPLANATION OF COURSE NUMBERS

First-group courses.—Courses numbered from 1 to 100 are planned for students in the freshman and sophomore years. With the approval of the adviser and the dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisites to advanced courses, but they may not be taken for graduate credit.

Second-group courses.—Courses numbered from 101 to 200 are planned for students in the junior and senior years. They may be taken for graduate credit only upon the approval of the dean and the instructor at the time of registration. Such approval is granted only with the provision that students must complete additional work in order to receive graduate credit.

Third-group courses.—Courses numbered from 201 to 300 (in the Graduate School of Arts and Sciences, the School of Government and Business Administration, and the School of Public and International Affairs); courses numbered 201 to 400 (in the School of Education) are planned primarily for graduate students. They are open, with the approval of the instructor, to qualified seniors; they are not open to other undergraduates. Qualified seniors in the School of Government and Business Administration registering for these courses must have a 3.00 average, the prior approval of the department chairman who is responsible for the graduate course, and the prior approval of the Dean.

Fourth-group courses.—Courses numbered 301 to 400 in the Graduate School of Arts and Sciences are limited to graduate students; but they are pri-

marily for doctoral candidates. Courses numbered 301 to 400 in the School of Government and Business Administration are limited to doctoral students. In the School of Education fourth-group courses, numbered 401 to 500, are limited to graduate students with Master's degrees from accredited institutions.

KEY TO ABBREVIATIONS

The following abbreviations are used in this catalogue for course designations and by students in registering for courses.

Acct	Accounting
AmCv	American Civilization
Anat	Anatomy
Anth	Anthropology
Ap S	Applied Science
A Th	Art Therapy
Bioc	Biochemistry
B Sc	Biological Sciences
B Ad	Business Administration
Chem	Chemistry
CE	Civil Engineering
Clas	Classics
Asia	East Asian Languages and Literatures
Econ	Economics
Educ	Education
EE	Electrical Engineering
Engl	English
E Ad	Engineering Administration
Epid	Epidemiology and Environmental Health
Hum	Experimental Humanities
ForS	Forensic Science
Fren	French
Gnet	Genetics
Geog	Geography and Regional Science
Geol	Geology
Germ	Germanic Languages and Literatures
HCA	Health Care Administration
Hist	History
HonP	Honors Program—Columbia College
Ital	Italian
Jour	Journalism
Mgt	Management Science
Math	Mathematics
Micr	Microbiology
Mus	Music
OR	Operations Research
Path	Pathology
Phar	Pharmacology
Phil	Philosophy
PE	Physical Education, Health, and Recreation
Phys	Physics
Phyl	Physiology
P Sc	Political Science
Port	Portuguese
Psyc	Psychology
P Ad	Public Administration
Rel	Religion
SLP	Service-Learning Program
Slav	Slavic Languages and Literatures
Soc	Sociology
Span	Spanish
S Ed	Special Education
Sp&D	Speech and Drama
Stat	Statistics
U&RP	Urban and Regional Planning

SEMESTER HOURS OF CREDIT

The number of semester hours of credit given for the satisfactory completion of a course is, in most cases, indicated in parentheses after the name of the course. Thus, a year course giving 3 hours of credit each semester is marked (3–3), and a semester course giving 3 hours of credit is marked (3). A semester hour usually consists of the completion of one fifty-minute period of class work or of one laboratory period a week for one semester.

TIME OF COURSE OFFERINGS

Following most course descriptions is a parenthetical statement listing the semester (fall or spring) for which the course is scheduled for 1972-73. The

term "academic year" is used only with two-semester courses, and indicates that the first half of the course is to be offered in the fall semester and the second half in the spring semester. If no parenthetical statement appears, the course is not scheduled to be offered during the fall or spring semesters of 1972-73. Offerings for the summer sessions are not designated in this catalogue. Students should consult the *Summer Sessions Catalogue* or *Schedule of Classes* for summer offerings. A *Schedule of Classes* is also published for each fall and spring semester which provides more exact and up-to-date information concerning the time of course offerings.

Accounting

Professor E.J.B. Lewis
Professorial Lecturers M.P. Pujol, A.L. Litke, Raymond Einhorn
Associate Professors F.C. Kurtz, Chei-Min Paik, A.J. Mastro (*Chairman*), M.G. Gallagher
Assistant Professorial Lecturers R.W. Perkins, E.J. Shuchart

Bachelor of Business Administration in the field of Accounting.—See pages 136–40.

Master of Business Administration with a field of concentration in Accounting.—Prerequisite: a Bachelor's degree, see page 144.

Required: the general requirements, pages 144–47. A "common body of knowledge" in business administration is required of all candidates; this knowledge may be obtained as part of an undergraduate degree in business or as part of the total Master of Business Administration degree program at this University. The "common body of knowledge" may be satisfied by the following courses at this University, or the equivalent: Acct 115; B Ad 102, 131, 141, 161, 181, 198; Econ 121; Mgt 119; and Stat 111. In addition to this requirement the student's program of study will consist of (1) the "Required Courses in Administration," including Acct 276, see page 146; (2) Acct 262, 295, Mgt 219; (3) (a) for students not electing a thesis—Acct 275, 282, 297, and 6 semester hours of elective, or (b) for students electing a thesis—Acct 275 or 282, and Acct 299, 300, and 6 semester hours of elective. Acct 215 must be taken in place of Acct 275 or 282 if a course in cost and budgetary control was not taken prior to entering the M.B.A. degree program. Elective courses are selected, with the approval of the adviser, from courses in other fields offered by the School; however, no more than 3 hours may be in one field, and none of the courses may be in Accounting.

Programs of study in Accounting leading to the degrees of *Doctors of Business Administration* and *Doctor of Public Administration.*—See pages 156–58.

FIRST GROUP

1–2 **Introductory Accounting** (3–3) Gallagher, Kurtz

Basic understanding of accounting concepts, procedures, analyses, and reports; the accounting measurement and communication of significant economic and financial data. Prerequisite to Acct 2: Acct 1. Students who have received credit for Acct 115 cannot receive credit for Acct 1–2. (Acct 1 and 2—fall and spring)

SECOND GROUP

101 Cost and Budgetary Control (3)

Cost behavior and volume-profit relationships, responsibility accounting, standard costs, flexible budgets, cost structures for control and motivation, relevant costs, cost concepts. Prerequisite: Acct 1–2. Students who have received credit for Acct 193 or 215 cannot receive credit for Acct 101. (Fall and spring)

111 Financial Statement Analysis (3)

Analysis and interpretation of financial statements for the guidance of management, directors, stockholders, and creditors. Prerequisite: Acct 1–2. (Spring)

115 Survey of Financial Accounting (3)

Development, presentation, and interpretation of financial accounting data necessary to the management process. Students who have received credit for Acct 1–2 cannot receive credit for Acct 115. (Fall and spring)

121 Intermediate Accounting (3)

In-depth study of accounting functions and basic theory: acquisition of assets and services, income and equity accounting, preparation and analysis of financial statements. Prerequisite: Acct 1–2. (Fall)

122 Intermediate Accounting (3)

An in-depth study of special topics: partnership, consignment, installment, liquidation, retail, estate, and trust accounting. Prerequisite: Acct 121.

132 Accounting Theory (3)

Current thought as reflected in the pronouncements of leading professional and accounting research associations, major contributions to accounting literature. Prerequisite: Acct 121. (Spring)

141 Governmental Accounting (3)

Appropriation, encumbrance, and fund accounting for governmental and institutional entities. Prerequisite: Acct 1–2. (Fall)

144 Federal Accounting (3)

Accounting procedures in the federal government, with emphasis on agency-level accounts and accounting support for cost-based budgets. Prerequisite: Acct 141.

161 Federal Income Taxation (3)

Federal income tax concepts applicable to individuals and corporations. (Fall and spring)

162 Tax Research and Planning (3)

Substantive federal tax provisions relating to corporations, partnerships, security transactions, estates, gifts, and pension and profit-sharing plans, emphasis on tax research and tax-planning objectives.

171 Auditing (3)

Principles and procedures of auditing: generally accepted auditing standards, internal control, audit objectives and reports, form-preparation of audit work papers, audit evidence. Prerequisite: Acct 121.

172 **Audit Planning and Control** (3) **Kurtz**

Standards of audit reporting and other current auditing topics, including application of statistical sampling techniques to auditing, auditing electronic systems, and management advisory services. Prerequisite: Acct 171.

181 **Accounting Systems** (3)

Organization and use of accounting information: origination, classification, control, and reporting; development, design, and installation of accounting systems; accounting communication patterns. Prerequisite: Acct 101, 171. (Spring)

191 **Advanced Accounting** (3) **Gallagher**

Application of accounting theory to special areas: consolidated statements, business combinations, earnings per share, foreign exchange, price-level adjusted statements, source and application of funds. Prerequisite: Acct 121. (Spring)

193 **Business Budgeting** (3) **Lewis, Paik**

Principles and procedures in the development, installation, and operation of a system of budgetary control to aid management. Prerequisite: Acct 1–2. Students who have received credit for Acct 101 cannot receive credit for Acct 193. (Fall and spring)

196 **Management Decisions and Accounting** (3)

Analysis of data required in capital budgeting, inventory management, and other decisions; cash-flow and probability data; advanced cost accounting systems. Prerequisite: Acct 101.

THIRD GROUP

215 **Survey of Managerial Accounting** (3) **Paik**

Study of the nature, analysis, and interpretation of accounting reports primarily from the management point of view. Prerequisite: Acct 1–2 or 115. Students who have received credit for Acct 101 cannot receive credit for Acct 215. (Fall and spring)

231 **Contemporary Accounting Theory** (3) **Mastro**

Accounting principles and concepts and recent theories concerned with the valuation and amortization of assets and determination of income. Prerequisite: 6 semester hours of accounting.

241 **Accounting and Related Disciplines** (3) **Paik**

Interrelationships of accounting and behavioral sciences, economics, mathematical methods, operations research. Prerequisite: 6 semester hours of accounting.

245 **Decision Systems and Accounting** (3) **Paik**

Limited to students in the Navy Graduate Financial Management Program. Managing financial and related information systems in complex organizations; relationships between accounting in its broadest sense and management control and decision systems. (Spring)

246 **Governmental Accounting and Budgeting Problems** (3) **Lewis**

Current problems in federal financial planning, programming, budgeting, accounting, and auditing. Prerequisite: Acct 144.

262 **Business Income Taxation** (3) Gallagh

Federal income tax concepts applicable to corporations, partnerships, a their owners; emphasis on tax planning factors in business decisions a tax research. (Fall)

275 **Contemporary Auditing Theory and Procedures** (3) Ku

Study of generally accepted auditing standards: internal control and ternal auditing, application of statistical sampling to auditing, audit electronic data processing systems. Prerequisite: Acct 1–2 or 115. (Spring)

276 **Management Planning and Control** (3) Pi

Integrative case study approach to management systems for plann control, and decisions: value indices for organizational sub-units, tran pricing, contemporary control systems, accounting framework and sy Prerequisite: Acct 1–2 or 115. (Spring)

282 **Accounting Information Systems** (3)

Development and application of accounting system theory, includi analysis, design, and implementation. Integration of automatic data pro essing, accounting systems, and management information systems. Pr requisite: Acct 1–2 or 115. (Spring)

292 **Professional Accounting Review** (3) Lev

Review and coordination of principles and techniques in preparation general practice in the field of accountancy and for professional accoun examinations. Prerequisite: Acct 101, 141, 161, 171, and 191.

295 **Seminar in Accounting** (3) Mast

Selected accounting studies: critical analysis and evaluation developed seminar discussions and papers. Prerequisite: Acct 1–2 or 115. and spring)

297 **Accounting Research** (3) Mast

299 **Thesis Seminar** (3) Mastro and Sh

(Fall and spring)

300 **Thesis Research** (3) Mastro and Sh

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Mastro and Sh

Limited to students preparing for the Doctor of Business Administra or Doctor of Public Administration general examination. May be peated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Mastro and Sh

Limited to Doctor of Business Administration or Doctor of Public A ministration candidates. May be repeated for credit. (Fall and spri

American Studies Program

Professors R.H. Walker, Jr., C.C. Mondale
Associate Professor Letitia Brown
Assistant Professors H.F. Gillette, Jr., B.M. Mergen (*Director*)
Adjunct Assistant Professor R.S. French
Special Lecturer Lillian Miller

FACULTY ADVISORY COMMITTEE

B.M. Mergen (*Chairman*), C.W. Cole, C.E. Galbreath, F.S. Grubar, H.L. LeBlanc, C.H. Pfuntner, R.P. Sharkey, R.W. Stephens, Dewey Wallace, Jr.

AMERICAN STUDIES COUNCIL

The Council serves the American Studies Program in an advisory capacity from several points of view, as follows:

From the Washington Community

Aaron Goldman, *President, Macke Vending Co.*
Laughlin Phillips, *Editor,* The Washingtonian
Sterling Tucker, *Vice Chairman, District of Columbia Council*

From the Student Body

Two undergraduate students; two graduate students

From the Alumni

C. Robert Kemble

From Affiliated Programs

Robert H. Land (Library of Congress)
Atlee Schidler (Washington Center for Metropolitan Studies)
Wilcomb E. Washburn (Smithsonian Institution)

From the Faculty

The American Studies staff of instruction and the Faculty Advisory Committee, ex officio

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Bachelor of Arts with a major in American Civilization (Field-of-Study).—The following requirements must be fulfilled.

1. The general requirements stated on pages 78, 83-88.
2. Prerequisite course—AmCv 71–72. (In preparation for the major field it is recommended that students elect introductory courses in Anthropology, Art, Economics, English, Geography and Regional Science, History, Philosophy, Political Science, Religion, and Sociology.)
3. Required courses in the major—(a) 15 semester hours of approved second-group courses in the Humanities (History may be elected for (a) or (b), but not for both); (b) 15 semester hours of approved second group courses in Social Studies; (c) AmCv 179–80, which must be taken in the senior year.
4. In addition to the "meaningful initiation" requirement, see page 78, students must elect 3 or 4 additional semester hours in the Natural and Mathematical Sciences or in Geography and Regional Science.

The major examination required of all seniors must be satisfactorily completed
the first semester of the final year.

Two years of a foreign language or adequate preparation in statistics, logic,
linguistics is strongly recommended. Students should consult frequently with
American Civilization adviser.

Master of Arts in the field of American Civilization.—Prerequisite: the degree
Bachelor of Arts with an undergraduate major in American Civilization or in
subject in which concentration is contemplated.

Required: the general requirements, pages 93–100, including (1) AmCv 271–72
semester hours), a seminar in the methods and materials for teaching and resea
in American Civilization; (2) 18 additional semester hours in a carefully rela
pattern, focusing on a concentrated approach to the study of American Civilizat
(3) a Master's thesis (6 semester hours) written on an approved topic under
direction of the instructor in whose field the major emphasis falls; (4) a Mast
Comprehensive Examination reflecting the candidate's area of concentration.

Doctor of Philosophy in the field of American Civilization.—This program co
bines work in the humanities and/or social sciences as preparation for research
teaching, with the option of stressing preparation for museum and library caree
Applicants are required to have an adequate background in the humanities and
social sciences as they apply to the understanding of American civilization.

Required: the general requirements, pages 93–97, 100–102. Candidates must pass
General Examination in four areas. An area in American Cultural History and
area in the culture of some area outside the United States (i.e., English Literatu
European History) are required. The other two areas may be chosen from the
lowing groups: (1) American Diplomatic, Economic, Political, or Social Histo
American Literature, Art, Philosophy, or Religion; Afro-American History; or so
areas of the social and behavioral sciences; (2) in affiliation with the Library
Congress—supervised historical study in bibliographic resources including Americ
History and Politics, Cartography, Cross-cultural Studies, Government Documen
Graphic Arts and Music, Motion Pictures and Recorded Sound, Printing and Bo
making; (3) in affiliation with the Smithsonian Institution (Museum of History a
Technology, National Portrait Gallery, and National Collection of Fine Arts)
supervised studies including Architectural History, Ethnohistory, Historical Arch
ology, History of Science, History of Technology, Industrial Archeology, Mate
Aspects of American Civilization, and various fields in the History of Art. A
ditional areas of study may be arranged within the University and in both
Library of Congress and Smithsonian cooperative programs. Special announcemen
concerning these programs are issued periodically and are available in the Offic
the Director of the American Studies Program.

Research fields for the dissertation may be chosen from any of the above area
those dealing with the culture of an area outside the United States.

AMERICAN CIVILIZATION

FIRST GROUP

71–72 **Introduction to American Civilization** (3–3) Mergen and St

Themes and issues in American civilization since Colonial times,
emphasis on their contemporary importance. (Academic year)

SECOND GROUP

161–62 **Studies in American Literature** (3–3)

Same as Engl 161–62. Major factors in the national cultural tradition

shown by outstanding writers. Prerequisite: Engl 51–52 or 71–72. (Academic year)

179–80 **Proseminar in American Civilization** (3–3) Gillette, Mergen, Mondale

Coordinating course for seniors majoring in American Civilization. (Academic year)

188 **Urban Issues** (3) Gutheim

Urbanization as a process. Population, life styles, planning, and land. (Spring)

*192 **The American Cinema** (3) Staff

History and criticism of American films. At least one film will be shown each week, on which there will be readings, discussions, and lectures. The course will enable the student to develop an ability to see and evaluate cinema techniques, to express the evaluation clearly in writing, and to understand the role of films in the context of American culture.

THIRD GROUP

271–72 **Seminar: Research and Teaching in American Civilization** (3–3) Gillette

Consideration of American studies as an area for research and teaching: introduction to bibliography. Required of candidates for the degree of Master of Arts in the field of American Civilization. (Academic year)

†273–74 **Research Seminar: Materials in American Negro Culture** (3–3) Brown

Prerequisite: Hist 173–74 or equivalent. (1973–74 and alternate years—academic year)

280 **Seminar: Urban History** Gutheim

(Spring)

281 **Seminar: Early American Literature** (3) McCandlish

Same as Engl 281.

289–90 **Seminar: Topics in American Civilization** (3–3) Gillette

Research problems selected by the instructor. Preparation in American Cultural History or other area appropriate to the topic of the seminar. (Academic year)

295 **Independent Studies** (arr.) Staff

Limited to Master's candidates. Permission of instructor, in writing, required. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

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* Joint offering of the American Studies Program and the Department of Speech and Drama. Students may register under either designation.

† Joint offering of the Department of History and the American Studies Program. Students may register under either designation.

FOURTH GROUP

*373–74 **Readings on the Negro in American Culture** (3–3) Brow

For students preparing for the Doctor of Philosophy general examinat in the field of the Negro in American Culture. (1972–73 and alte nate years—academic year)

379–80 **Readings in American Cultural History** (3–3) Mergen, Walke

For students preparing for the Doctor of Philosophy general examinat in the field of American Civilization. (Academic year)

398 **Advanced Reading and Research** (arr.) Staf

Limited to students preparing for the Doctor of Philosophy general ex amination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staf

Limited to Doctor of Philosophy candidates. May be repeated for credi (Fall and spring)

COURSES OFFERED IN AFFILIATION WITH THE LIBRARY OF CONGRESS

The Graduate School of Arts and Sciences is affiliated with the Library of Congres in a program leading to the degree of Doctor of Philosophy. The following course are offered at the Library of Congress by members of its staff:

THIRD GROUP

255–56 **Research Orientation Seminar: Americana in the Library of Congress** (3–3)

Examination of the collections of the Library of Congress with the aim of increasing understanding of American culture and awareness of th brary-oriented research problems and possibilities. For students in the affiliated doctoral program, this course may lead directly to a field e "Research Materials for the Study of American Life: Their Content, Co lection, Arrangement, and Use." (1973–74 and alternate years—aca demic year)

FOURTH GROUP

355–56 **Seminar: Advanced Library Research** (3–3)

Introduction to practical problems of research in librarianship and continu of collections. Supervised study in selected subject fields; emphasis on collections in the Library of Congress and concentrated work in a special collection. Prerequisite AmCv 255–56. (Academic year)

389 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general exam ination in fields offered in affiliation with the Library of Congress. May be repeated for credit. (Fall and spring)

* Joint offering of the Department of History and the American Studies Program. Students may register under either designation.

390 **Dissertation Research** (arr.)

For Doctor of Philosophy Candidates preparing dissertations based upon or significantly related to collections of the Library of Congress. Supervised by specialists at the Library. Prerequisite AmCv 355–56. (Fall and spring)

COURSES OFFERED IN AFFILIATION WITH THE SMITHSONIAN INSTITUTION

The Graduate School of Arts and Sciences is affiliated with the Smithsonian Institution's Program for Graduate Students in the History of American Civilization. The following courses are offered at the Museum of History and Technology and at the National Portrait Gallery, by members of its staff:

THIRD GROUP

250 **Orientation Course: Material Aspects of American Civilization** (3)

Familiarization with the historical collections of the Smithsonian Institution and introduction to opportunities for research and publication based on historical objects. Required of all students in the Master's and doctoral programs affiliated with the Smithsonian Institution. (Fall)

*284 **Seminar: Studies in American Art and History** (3) Miller

Exploration of selected problems and themes in American cultural history involving the use of artistic materials in different media; emphasis on methodology and analytic techniques. (Spring)

†294 **Field Research in Historical Archeology** (3)

Field techniques, including excavation, recording, photography, preservation, laboratory analysis and interpretation, supplemented by seminars on the history, ethnography, and ethnohistory of 17th century St. Mary's City, Md.

FOURTH GROUP

351–52 **Research in Selected Aspects of American Civilization** (3–3)

Supervised study and/or field work in selected subject areas related to the activities of the Smithsonian Institution. Prerequisite: AmCv 250. (Academic year)

394 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination in fields offered in affiliation with the Smithsonian Institution. May be repeated for credit. (Fall and spring)

395 **Dissertation Research** (arr.)

For Doctor of Philosophy candidates preparing dissertations significantly related to the material aspects of American civilization. Students work under curatorial supervision at the Smithsonian Institution. Prerequisite: AmCv 351–52. May be repeated for credit. (Fall and spring)

* Joint offering of the Department of Art and the American Studies Program. Students may register under either designation.

† Joint offering of the Department of Anthropology and the American Studies Program, in cooperation with St. Mary's College, the Smithsonian Institution, and the St. Mary's (Md.) City Commission.

Anatomy

Professors I.R. Telford (*Emeritus*), Paul Calabrisi, C.M. Goss (*Visiting—Medical History*), F.D. Allan, T.N. Johnson
Professorial Lecturers J.L. Angel, T.S. Reese
Associate Professors J.B. Christensen, E.N. Albert
Associate Clinical Professor R.N. Brown
Associate Professorial Lecturers J.A. Di Paolo, L.E. Church, Joan Blanchette-Mackie, A.L. Shabo
Assistant Professor Marilyn Koering

Master of Science in the field of Anatomy.—Prerequisite: a Bachelor's degree with a major in a biological science or Chemistry from this University, or an equivalent degree. The undergraduate program must have included the following courses, or equivalent: B Sc 11–12; Chem 11–12, 51–52, 53–54; Phys 1, 2. Bioc 221–22 is recommended as an elective.

Required: the general requirements, pages 93–100, including Anat 202, 203, 204, 205, 221–22, 295, 299–300, and graduate courses in Biochemistry, Physiology, or related fields selected with the approval of the Department. It is not always possible to arrange courses and research so that the student can be assured of completing all the required work in one academic year.

Doctor of Philosophy in the field of Anatomy.—Required: the general requirements, pages 93–97, 100–102. Candidates must fulfill the tool requirement by passing a reading knowledge examination in French and German or by passing the examination in one of these languages and satisfactorily completing the tool requirement in Biostatistics. The General Examination must cover at least four fields, two of which must be in anatomical disciplines.

Research fields: Cell Ultrastructure, Embryology, Gross Anatomy, Histology, Human Genetics, Neuroanatomy, and Physical Anthropology.

202 Gross Anatomy (6) Calabrisi and Staff

Regional dissections of adult cadaver supplemented with lectures and X-rays. Laboratory fee, $30. (Fall)

203 Human Embryology (1) Allan

Origin and development of human body; emphasis on value of embryology in interpreting anatomical anomalies. (Fall)

204 Neuroanatomy (2) Johnson and Staff

Gross and microscopic anatomy of central nervous system and special senses. Laboratory fee, $13. (Fall)

205 Microscopic Anatomy (3) Staff

Microscopic structure of cells, tissues, and organs of the human body. Laboratory fee, $13. (Fall)

221–22 Seminar (1–1) Johnson and Staff

Research reports and discussions of special topics by staff and graduate students. (Academic year)

249 Introduction to Anatomical Research (1) Staff

Major research techniques as applied to biological materials in the various anatomical disciplines. (Fall)

252 **Physical Anthropology** (1) Angel

Variations in man and factors affecting him, human evolution and racial differences, anatomy and culture of ancient man. (Spring)

254 **Fetal Anatomy** (2) Allan

Dissection of early and late human fetus. Comparison of fetal and adult structures. 20 students. Laboratory fee, $10. (Spring)

256 **Human Genetics** (1) C.B. Jacobson

General principles of genetics, new cytogenetics techniques, aneuploidy in man and its significance, biochemical aspects of heredity, genetic counseling. (Spring)

258 **Cytology** (3) Albert and Staff

Detailed study of morphology and function of the cell and its organelles. Basic cytological techniques emphasized. Laboratory fee, $20. (Spring)

260 **Electron Microscopy in Cellular Biology—Lecture** (1) Koering

Anat 260 may be taken without 261. (Spring)

261 **Electron Microscopy in Cellular Biology—Laboratory** (2) Koering

Prerequisite or concurrent registration: Anat 260. 12 students. Laboratory fee, $15. (Spring)

262 **Gross Anatomy of Upper and Lower Extremities** (2) Calabrisi

Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. 24 students. Laboratory fee, $10. (Spring)

264 **Gross Anatomy of Head and Neck** (2) Christensen

Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. 24 students. Laboratory fee, $10. (Spring)

266 **Gross Anatomy of Thorax and Abdomen** (2) Christensen

Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. 24 students. Laboratory fee, $10. (Spring)

268 **Gross Anatomy of Pelvis, Perineum, and Lower Extremity** (2) Calabrisi

Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. 24 students. Laboratory fee, $10. (Spring)

270 **Dissection of the Human Brain** (1) Johnson

Dissection of major pathways and nuclei of the brain with consideration of ventricular system; conferences and assigned reading. 20 students. Laboratory fee, $10. (Spring)

272 **Autonomic Nervous System** (1) Allan

Development, microscopic and gross anatomy, function of central and peripheral components of autonomic nervous system. (Spring)

274 **Tissues of the Body** (1) Staff

Basic concepts in anatomy, with emphasis on primary tissues of the body —their histogenesis, growth, functions, regenerative capacities, aging, death. (Spring)

276 **Advanced Studies in Anatomy** (1) Staff

Lectures and conferences on selected anatomical subspecialties—endocrinology, teratology, growth, etc. May be repeated for credit. (Spring)

278 **History of Anatomy and Surgery** (1) Goss

Lectures and discussions related particularly to the lives and times of outstanding contributors to the advancement of the science of anatomy and surgery. (Spring)

295 **Research** (arr.) Staff

Content differs each time course is offered; may be repeated once for credit. Fee to be arranged. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Anthropology

Professor R.K. Lewis
Professorial Lecturers J.L. Angel, Ruth McKay
Associate Professor R.L. Humphrey, Jr. (*Chairman*)
Assistant Professors Ruth Krulfeld, V.K. Golla, Suzanne Simons
Assistant Professorial Lecturer George Stuart

Bachelor of Arts with a major in Anthropology (Departmental)—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88.
2. Prerequisite course—Anth 1–2.
3. Required courses in other areas—(a) 12 semester hours, or equivalent, of introductory French, German, Russian, or Spanish (or another major language approved by the Department of Anthropology), (b) 6 to 12 semester hours of cognate work in related departments. Recommended for ethnological emphasis are courses in Economics, Political Science, Psychology, and Sociology; for archeological emphasis, courses in American Civilization, Art History, Geography and Regional Science, Geology, and History; for emphasis in physical anthropology, courses in Anatomy and Biological Sciences. Statistics is strongly recommended for all Anthropology majors.
4. Requirements for the major—24 to 30 semester hours in Anthropology courses including Anth 192 and second group courses in each of the following categories: Aspects of Culture (courses numbered in the 150's), Linguistics (courses numbered in the 160's), Ethnology (courses numbered in the 170's), and Physical Anthropology or Archeology (courses numbered in the 180's). Qualified seniors may enroll in 200-level courses with permission of the instructor. Up to 6 semester hours of ethnographic or archeological field school credit may be accepted and applied toward the major with the approval of the Department, and majors are encouraged to participate in such summer programs offered here or elsewhere. Opportunities

field and laboratory research participation are also periodically available to exceptionally able students both with staff members conducting research and at one of the several excellent anthropological museum facilities in the area. Credit for such work may be granted through registration for Anth 195.

Bachelor of Arts with a major in Classical Archeology and Anthropology (Departmental).—An interdepartmental major offered by the departments of Anthropology and Art. The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should consult a departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Natural and Mathematical Sciences.)
2. Prerequisite course—Anth 1–2.
3. Required courses in the major.—Anth 152, 158, 177, 183; Art 101, 102, 103, 111; Hist 109, 110. (A reading knowledge of French and German is recommended.)

Master of Arts in the field of Anthropology.—Prerequisite: a Bachelor of Arts degree with a major in Anthropology from this University, or an equivalent degree.

Required: the general requirements, pages 93–100. The minimum requirement consists of 24 semester hours of Anthropology courses plus a thesis (equivalent to 6 semester hours). A thesis is preferred; however, under certain circumstances, with the approval of the Department, students may elect a program of study consisting of 30 to 36 semester hours of Anthropology courses without a thesis. There are no specific required courses; however, the student's program must cover the major areas of anthropological interest which have been approved in advance by the Department graduate adviser. A reading knowledge examination in one foreign language must be passed before beginning the third semester of graduate work. Students who are writing a thesis must take the Master's Comprehensive Examination before registration for the second half of thesis work.

Departmental prerequisite: Anth 1–2 is prerequisite to all other courses in Anthropology except Anth 158 and 162. This prerequisite may be waived by permission of the instructor.

FIRST GROUP

1–2 **Introductory Anthropology (3–3)** **Staff**

Anth 1: survey of man's origin, physical evolution, and culture history. Anth 2: survey of the world's cultures, illustrating the principles of cultural behavior. (Anth 1 and 2—fall and spring)

SECOND GROUP

150 **Comparative Value Systems (3)** **Krulfeld**

Examination of world views, conceptual systems, and value orientations of representative cultures throughout the world. (1973–74 and alternate years—fall)

151 **Primitive Economics (3)** **Krulfeld**

Comparative study of various economic organizations, including hunters and gatherers, herders and cultivators.

152 **Man, Culture, and Environment (3)** **Humphrey**

Basic principles of cultural ecology. Man's interaction with the ecosystem both past and present; emphasis on the application of anthropological precepts to current environmental problems. (1972–73 and alternate years—fall)

McKay

153 **Psychological Anthropology** (3)

Relevance of psychological theories to human evolution and the cross-cultural study of personality. Cultural determinants of personality formation and mental health. (Fall)

Golla

154 **Mythology and Folklore** (3)

Unwritten literature as an expression of imaginative and creative thought; the place of mythology and folklore in social organization, in enculturation, and in social control. (Fall)

Simons

155 **Primitive Religion** (3)

Conceptions of the supernatural in nonliterate societies. Examination of religious beliefs and practices. Emphasis on states of consciousness. (1973–74 and alternate years—spring)

Simons

156 **Comparative Political and Legal Systems** (3)

Cross-cultural study of ancient and modern systems of social control; moral, ethical, and legal factors which operate to produce behavioral norms. (1972–73 and alternate years—spring)

Simons

157 **Primitive Social Organization** (3)

The analysis of the social organization of primitive peoples; kinship, economic, and political systems. (Fall)

Krulfeld

158 **Art and Culture** (3)

Study of the art of tribal society, including the role of art in culture, influences upon the artist, and beliefs and practices associated with art production. (Fall or spring)

Golla

159 **Ethnoscience** (3)

Comparative study of branches of knowledge, such as astronomy, botany, mathematics, psychology, technology, and zoology, as these are empirically derived and systematically arranged in selected preindustrial societies. (1973–74 and alternate years—fall)

Golla

161 **Language and Culture** (3)

Structure and semantics of systems of human communication; linguistic change; influence of language on world view. (Fall)

Golla

162 **Linguistics in Anthropology** (3)

Introduction to general (descriptive and comparative) linguistics. (Spring)

Lewis

170 **Cultures of the Caribbean** (3)

Study of the culture history and ways of life of the various cultural groups of the area up to the ethnographic present. (1973–74 and alternate years—spring)

Simons

171 **Native Peoples of North America** (3)

Comparative study of Indian groups representative of each of the culture areas of the continent. (1972–73 and alternate years—spring)

Staff

172 **Native Peoples of South America** (3)

Survey of Indian groups representative of each of the culture areas of the continent. Hacienda, plantation, and urban adaptations of Indian and African groups. (Fall)

173 **Cultures of the Pacific** (3) — Lewis

Study of the culture history and ways of life of the native peoples of Melanesia, Micronesia, and Polynesia. (1972–73 and alternate years—fall)

174 **Far Eastern Communities** (3) — Krulfeld

Study of social organizations, religions, economies, and problems of current anthropological interest for cultures of the Far East, including Japan, Korea, China, and India. (1972–73 and alternate years—spring)

175 **Cultures of Southeast Asia** (3) — Krulfeld

Study of representative Southeast Asian cultures from primitive groups to high civilizations. (1973–74 and alternate years—fall)

176 **Cultures of the Circumpolar Region** (3) — Humphrey

Survey of the social and economic adaptations to an extreme climate made by peoples of the northern sub-arctic and arctic regions of North America and Eurasia. (Spring)

177 **Cultures of the Near East** (3) — Lewis

Study of the geographic environment, language, religion, and social structure of settled and nomadic peoples of the Near East; emphasis on the Arab world. (1972–73 and alternate years—spring)

178 **Cultures of South and East Africa** (3) — Lewis

Comparative examination of the history, cultural development, and contemporary problems of cultures of southern and eastern Negro Africa. (1973–74 and alternate years—fall)

179 **Cultures of West and Central Africa** (3) — Lewis

Comparative examination of the history, cultural development, and contemporary problems of cultures of western and central Negro Africa. (Spring)

182 **New World Archeology** (3) — Humphrey

Survey of North American culture history from man's entry into the Americas during the Pleistocene period until the time of the first European contacts. (Spring)

183 **Old World Archeology** (3) — Humphrey, Lewis

Survey of human prehistory in Europe, Africa, and Asia from the earliest hominid cultures to the beginnings of advanced agricultural civilizations and their secondary centers. (Fall)

184 **Ethnohistory** (3) — Stuart

Cultural reconstruction of behavioral and ideological patterns of past societies. Specific cultural area to be announced in the *Schedule of Classes*.

185 **Latin American Archeology** (3) — Humphrey, Stuart

The culture history of pre-Columbian Mexico and Central America from the Paleo-Indian period through the Spanish Conquest, emphasizing the origin and development of Latin American high civilizations. (1972–73 and alternate years—spring)

186 **Physical Anthropology** (3) Angel

Study of human variation past and present, seen as a product of physical and cultural evolution. (Spring)

192 **Anthropological Theory** (3) Krulfeld

Analysis of the theoretical postulates and assumptions underlying the development of modern cultural anthropology. (Fall and spring)

193 **Anthropological Methods** (3) Krulfeld

Approaches to library and field research. Conceptual bases and bias in the delineation of problems; in the selection, analysis, and organization of data; and in the preparation of the final report. (1972–73 and alternate years—fall)

195 **Undergraduate Research** (arr.) Staff

Individual research problems. May be repeated for credit. (Fall or spring)

THIRD GROUP

202 **Seminar: Recent Trends in Anthropology** (3) Krulfeld

Major topics of interest in contemporary anthropology since the mid-20th century will be taken up in order, stressing current journal and monograph materials. (1973–74 and alternate years—fall)

261 **Seminar: Anthropological Linguistics** (3) Golla

(Formerly Field Methods in Linguistics)

Anthropological study of language—dialectology, ethnosemantics, descriptive and comparative studies of exotic languages.

262 **Seminar: Applied Anthropology** (3) Staff

Use of anthropological methods and techniques in such specific fields as government, community development, land reform, law, and medicine. (Spring)

263 **Seminar: Culture Contact and Change** (3) Simons

Western impact on non-Western cultures. Workings and processes of social change as variant cultures and ethical systems interact. (1972–73 and alternate years—fall)

264 **Seminar: Museum Techniques** (3) Humphrey

Principles of anthropological collection, classification, preservation, identification, interpretation, and exhibition of specimens; research and instructional use of the museum. Field trips to area museums. (Fall)

265 **Seminar: Method and Theory in Archeology** (3) Humphrey

Analysis of field techniques, dating methods, and theoretical approaches in reconstructing and interpreting the cultures of the past, utilizing the most recent archeological techniques. (Spring)

266 **Seminar: Technology** (3) Humphrey, Lewis

Cross-cultural examination of the form, function, meaning, and use of material culture and the behavior patterns involved in its production. (1972–73 and alternate years—spring)

267 **Seminar: Economic Anthropology** (3) Krulfeld

Comparative study of preindustrial systems of production, distribution, and consumption. (Spring)

268 **Seminar: Peasant Society** (3) Krulfeld

Cross-cultural analysis of peasant societies, including an examination of their manner of functioning within their larger social, economic, and cultural context. (Fall)

269 **Seminar: Structural Problems** (3) Simons

Comparative survey of principles of descent, kinship terminology, and formation of descent groups; problems of variation and change in kinship systems and development of kinship models. (Spring)

272 **Seminar: Topics in Latin American Anthropology** (3) Staff

Research topic selected from among peasant movements, ethnic groups, land reform, urbanization, archeological problems. (Spring)

273 **Seminar: Culture of Poverty** (3)

Cross-cultural consideration of basic assumptions about the life of the poor within pluralistic societies with the aim of gaining theoretical insights into the nature of culture itself. (1972–73 and alternate years—spring)

274 **Seminar: Afro-American Culture** (3) McKay

An ethnographic survey of racial, linguistic, and cultural attributes of Americans of African ancestry. African antecedents, conditions of migration, experiences in slave and free communities over their 350-year history in the United States. (Spring)

282 **Seminar: Advanced Archeology—North American Prehistory** (3) Humphrey, Stuart

Analysis in depth of current archeological problems relating to the origin and development of aboriginal American cultures. (Fall)

283 **Seminar: Advanced Archeology—Old World** (3) Staff

Study, in detail, of the beginnings of human culture and the development of civilization in the Old World (1973–74 and alternate years—spring)

287 **Seminar: Problems in Latin American Civilization** (3) Gordon

Interdisciplinary seminar partially guided by a specialist within the methodology of his chosen discipline; each student writes a report on some aspects of a selected key theme. Admission by permission of instructor. (Spring)

*294 **Field Research in Historical Archeology** (3)

Field techniques, including excavation, recording, photography, preservation, laboratory analysis and interpretation, supplemented by seminars on the history, ethnography, and ethnohistory of 17th century St. Mary's City, Md.

295 **Research** (arr.) Staff

May be repeated for credit. (Fall and spring)

* Joint offering of the Department of Anthropology and the American Studies Program, in cooperation with St. Mary's College, the Smithsonian Institution, and the St. Mary's (Md.) City Commission

299–300 **Thesis Research** (3–3) **Staff**
(Fall and spring)

Art

Professors D.C. Kline, W.A. MacDonald, L.P. Leite, F.S. Grubar (*Chairman*)
Professorial Lecturer Grace Evans
Associate Professors Roland Fleischer, D.H. Teller
Assistant Professors H.I. Gates, Lilien Hamilton, W.T. Woodward, Fuller Griffith, J.F. Wright, Jr., J.L. Lake
Assistant Professorial Lecturers H.L. Glicksman, Jane Kofler
Special Lecturer Lillian Miller
Faculty of the Corcoran School of Art: Roy Slade (*Dean*), Harold Baskin, William Christenberry, William Dutterer, Robert Epstein, Robert Foster, Eugene Frederick, Samuel Holvey, Jerry Lake, Blaine Larson, Jack Letkowitz, William Lombardo, Krystyna Marek, Ed McGowin, Christopher Muhler, Robert Newmann, Ramon Osuna, Jack Perlmutter, Paul Salmon, Charles Scheer, Berthold Schmutzhart, Rona Slade, A. Brockie Stevenson, Joseph Taney, Elliott Thompson, James Twitty

Bachelor of Arts with a major in Art History and Theory (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Social Studies and the Natural and Mathematical Sciences.)
2. Prerequisite courses—Art 31–32 or 71–72.
3. Required courses in related areas—Art 137; Fren 1–2, 3–4, or Germ 1–2, 3–4; Phil 162; or equivalent. (A reading knowledge of French or German should be acquired as soon as possible. Students who plan to do advanced work in Classical Archeology or Medieval Art are also advised to study Greek and Latin.)
4. Required courses in the major—Art 101 or 102, 104 or 105, 108, 109, 110, 112, 113 or 114, 117 or 118; 12 additional semester hours in second-group Art History and Theory courses.

Art History and Theory majors may apply for graduation with Special Honors. In order to be accepted into this program, students must satisfy the general requirements (page 51). They should apply in writing to the Chairman of the Department of Art at the beginning of their senior year. Before admittance to the program they must pass a reading examination administered by the Department in either French or German. Upon acceptance, candidates will be assigned to one or more faculty advisers under whose direction they will undertake a supervised program of selected reading on which they will be required to submit written, critical reports.

Bachelor of Arts with a major in Fine Arts (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Social Studies and the Natural and Mathematical Sciences.)
2. Prerequisite courses—Art 21–22, 41–42
3. Required courses in related areas—Art 31–32 or 71–72; 6 additional semester hours in second-group Art History courses.
4. Required courses in the major—27 semester hours of second-group Fine Arts

ourses in seven areas—Ceramics, Design, Drawing, Graphics, Painting, Photography, nd Sculpture. Students choose one of these areas as a primary area of concentra- on, in which 12 semester hours are required. The remaining 15 semester hours ust be distributed among the other areas, but only in the primary area can work ken amount to 12 semester hours. (Transfer students must take at least 12 emester hours of second-group Fine Arts courses in residence at this University, o matter how much advanced standing in Fine Arts is granted upon admission.)

Fine Arts seniors may apply for graduation with Special Honors. In order to be ccepted into this program, the student must satisfy the general requirements (see age 51). They should apply in writing to the Chairman of the Department of Art t the beginning of their senior year. Upon acceptance, each candidate will be ssigned one or more faculty advisers under whose direction he will complete a roject in his special area of interest. Upon completion of the project, the student ill present a one-man exhibit prepared exclusively outside of class, subject to the xamination of an Honors Board.

Bachelor of Arts with a major in Classical Archeology and Anthropology (Departmental).—An interdepartmental major offered by the departments of Art and nthropology. The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should onsult a departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Natural and Mathematical Sciences.)
2. Prerequisite course—Anth 1–2.
3. Required courses in the major—Anth 152, 158, 177, 183; Art 101, 102, 103, 11; Hist 109, 110. (A reading knowledge of French and German is recommended.)

Bachelor of Arts with a major in Classical Archeology and Greek (Departmental).—An interdepartmental major offered by the departments of Art and Classics. The ollowing requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should consult a departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Natural and Mathematical Sciences.)
2. Prerequisite courses—Clas 11–12, 13–14.
3. Required courses in the major—Art 101, 102, 103, 111; Hist 109, 110; 14 emester hours of second-group courses in Greek, including Clas 138. (A reading nowledge of French and German is recommended.)

Master of Arts in the field of Art History and Theory with concentrations in Classical Art and Archeology, American Art, Renaissance and Baroque Art, and *Contemporary Art.*—Prerequisite: a Bachelor of Arts degree with a major in Art History and Theory from this University, or an equivalent degree. Applicants from other institutions must present scores on the Graduate Record Examination to the Office of the Graduate School of Arts and Sciences.

Required: the general requirements, pages 93–100. As many as possible of the 24 semester hours of course work should be third-group courses. The courses must be completed in 6 semesters or less, with a grade of *A* in at least 6 semester hours of work, and with an overall quality-point index of at least 3.25. A reading knowledge examination, preferably in German or French, must be passed after completing 9 semester hours of course work. A general written Master's Comprehensive Examination on the problems in the field of Art History and Theory and a written thesis (equivalent to 6 semester hours) embodying the result of research on some specific topic in the history and theory of art are also required. For details, see the pamphlet on the Master of Arts in the field of Art History and Theory, which is available in the offices of the Chairman of the Department of Art and the Dean of the Graduate School of Arts and Sciences.

Master of Arts in the field of Classical Archeology, Classics, and History (an Interdepartmental degree program offered by the departments of Art, Classics, and History).—Prerequisite: A Bachelor's degree with a background in Classical Archeology and either Greek or Latin. Applicants from other institutions must present

scores on the Graduate Record Examination to the Office of the Graduate School of Arts and Sciences.

Required: the general requirements, pages 93–100. The program of study consists of 24 semester hours of course work (as many as possible should be third-group courses) selected in consultation with the appropriate adviser from the departments of Art, Classics, and History; plus a thesis (equivalent to 6 additional semester hours). Candidates must pass a reading knowledge examination in French or German. All candidates are required to pass a general Master's Comprehensive Examination.

Master of Arts in the field of Museology.—Prerequisite: a Bachelor of Arts degree with a major in Art History and Theory from this University, or an equivalent degree. Applicants from other institutions must present scores on the Graduate Record Examination to the Office of the Graduate School of Arts and Sciences.

Acceptance in this degree program as a *degree candidate* is provisional, pending the satisfactory completion of 12 semester hours of graduate Art History and Theory courses (this requirement will be counted toward the total semester hours required for the degree). Upon completion of these courses the student must make formal application in writing for *degree candidacy* to the joint George Washington University-National Collection of Fine Arts Committee on Museum Training. The application should state the reasons and aims for seeking this degree, and the student should submit letters of recommendation with the application. A personal interview will also be required.

Required: the general requirements, pages 93–100. The program of study consists of 36 semester hours of work as follows: 12 hours of Art History and Theory courses (taken before acceptance to degree candidacy, see above); Art 201–2, 271–72; and 12 additional hours of Art History and Theory courses selected in consultation with the adviser. Grades of *A* are required in at least two courses, and an over-all quality-point index of at least 3.25 must be maintained. A reading knowledge examination, preferably in German or French, must be passed after completion of 9 semester hours of course work. For details, see the pamphlet on the Degree of Master of Arts in the field of Museology, which is available in the offices of the Dean of the Graduate School of Arts and Sciences and the Chairman of the Department of Art.

Master of Fine Arts in the field of Ceramics, Design, Graphics, Painting, Photography, or Sculpture.—Prerequisite: a Bachelor of Arts degree with a major in Fine Arts in the field of Ceramics, Design, Drawing, Graphics, Painting, Photography, or Sculpture from this University, or an equivalent degree. Students planning to do graduate work in the field of Graphics or Painting must have 12 semester hours of Drawing on the undergraduate level prior to admittance to the Master's degree program.

Required: the general requirements, pages 93–100. In lieu of the foreign language requirement, Master of Fine Arts candidates are required to take 3 additional hours of course work in consultation with the adviser; as many as possible of the remaining 24 hours of course work should be in third group courses, only 18 hours of which may be in one area, the remaining 6 to be selected from related areas in consultation with the adviser. A creative thesis (equivalent to 6 semester hours) in ceramics, design, graphics, painting, photography, or sculpture, and a paper discussing some technical phase of the problem illustrated by the thesis are also required. A representative portion of the work illustrating the creative thesis may be retained by the University at the discretion of the thesis director in agreement with the second reader. For details, see the pamphlet on the Master of Fine Arts degree program, which is available in the offices of the Chairman of the Department of Art and the Dean of the Graduate School of Arts and Sciences.

Bachelor of Arts in Education with a teaching field in Art.—Prerequisite: the Education curriculum, pages 80–81.

Required: the Art option and professional courses listed on pages 110, 119.

ART HISTORY AND THEORY

FIRST GROUP

31–32 **Survey of Western Art** (3–3) Hamilton and Staff

Survey of the arts in the Western world from prehistoric to modern times. A foundation for further study in the history of art. (Art 31 and 32—fall and spring)

71–72 **Introduction to the Arts in America** (3–3) Kline, Grubar

Painting, sculpture, and architecture of America, with selected references to crafts and popular arts. Art 71: from Colonial beginnings to the Republican Age. Art 72: from early 19th century to the present. (Academic year)

SECOND GROUP

101 **Greek and Roman Architecture** (3) MacDonald

(Fall)

102 **Greek and Roman Sculpture** (3) MacDonald

(Spring)

103 **Classical Iconography** (3) MacDonald

Origin and development of myths in classical art.

104 **Renaissance Art in Italy I** (3) Evans, Leite

Early developments from the 13th to the 15th century. (Fall)

105 **Renaissance Art in Italy II** (3) Evans, Leite

High Renaissance and Mannerism. (Spring)

106 **Renaissance Art in the North I** (3) Fleischer

Fifteenth century painting in the Netherlands, Germany, France, and Spain. (Fall)

107 **Renaissance Art in the North II** (3) Fleischer

Sixteenth century painting in the Netherlands, Germany, France, and Spain. (Spring)

108 **18th Century Art in Europe** (3) Fleischer

Development of painting, sculpture, and architecture. (Fall)

109 **19th Century Art in Europe** (3) Leite, Hamilton

Painting and sculpture. (Fall and spring)

110 **Contemporary Art** (3) Leite, Hamilton

Painting and sculpture in 20th century Europe. (Fall)

111 **Classical Archeology** (3) MacDonald

Archeological monuments of classical civilizations, with intensive study of one or more areas selected from architecture, sculpture, painting, or minor arts. (Fall)

112 **Art of Egypt and the Ancient Orient** (3) MacDonald
Study of the art of Mesopotamia, Anatolia, Egypt, and Persia. (Spring)

113 **Baroque Art in Italy** (3) Evans, Leite
Development of painting, sculpture, and architecture in 16th and 17th century Italy. (Spring)

114 **Baroque Art in the North** (3) Fleischer
Development of painting, sculpture, and architecture in the 16th and 17th centuries in Holland, Flanders, Spain, France, Germany, and England (Spring)

115 **Christian Iconography** (3) Leite
Origins and development of Christian symbols and themes from early Christian to modern times.

117 **Medieval Art I** (3) Evans
Architecture, sculpture, and painting of the early Christian and Byzantine periods. (Fall)

118 **Medieval Art II** (3) Evans
Architecture, sculpture, and painting of the Romanesque and Gothic periods. (Spring)

119 **Pre-Romanesque Art in the North** (3) Kline
The Carolingian and Merovingian periods. (Spring)

120 **Art of China and Japan** (3) Kline
Architecture, painting, and sculpture of China, Korea, and Japan. (Fall)

145 **Folk Arts in America** (3) Gruber
Ceramics, woodcarving, ironwork, decorative painting, weaving, and other crafts. (Fall)

148 **19th Century American Painting** (3) Gruber
(Fall)

149 **19th Century American Sculpture** (3) Stal
(Spring)

THIRD GROUP

201–2 **Museum Projects** (3–3)
(*Formerly Art 201 Principles of Museum Work* (3))
Practical work to be determined by the Committee on Museum Training at the National Collection of Fine Arts. (Academic year) Kline

*203 **Primitive Art** (3)
Arts of prehistoric and primitive man in Europe, the pre-Columbian Americas, Oceania, and Africa. (Spring)

* May be taken for undergraduate credit with the approval of the instructor

*207 **Modern Architecture** (3) Kline

Development of modern architecture and building technology in Europe and America from the late 19th century to the present. (Fall)

216 **Medieval Painting** (3) Evans

Painting and the decorative arts.

†220 **Seminar: Baroque Art of the 17th Century** (3) Fleischer, Leite

Specific area announced in *Schedule of Classes*. A reading knowledge of Italian is desirable for the Italian area and German for the northern area. (Spring)

†221 **Seminar: Renaissance Art** (3) Fleischer, Leite

Specific area announced in *Schedule of Classes*. A reading knowledge of Italian is desirable for the Italian area and German for the northern area. (Fall)

†243 **Seminar: American Art** (3) Kline, Grubar

Specific area announced in *Schedule of Classes*. (Fall)

244 **Seminar: 19th Century European Art** (3) Leite

Specific area announced in *Schedule of Classes*. Reading knowledge of French desirable. (Spring)

245 **Seminar: 20th Century European Art** (3) Leite

Specific area announced in *Schedule of Classes*. (Spring)

246 **Seminar: Classical Art** (3) MacDonald

Specific area announced in *Schedule of Classes*. (Spring)

247 **Seminar: Medieval Art** (3) Evans

(Fall)

248 **Independent Research** (3)

Open only to Master's degree candidates. To be arranged in consultation with individual instructors. May be repeated for credit. (Fall and spring)

261 **Seminar: Problems in Art History** (3) Staff

As determined by the instructor, this course will deal with the theory, criticism, or methodology of art history. May be repeated for credit. Topic to be announced in *Schedule of Classes*. (Fall)

271–72 **Museum Techniques** (3–3) Staff

Intern training in museum work to be determined by the Committee on Museum Training at the National Collection of Fine Arts. (Academic year—4 hours daily, Monday through Friday)

‡284 **Seminar: Studies in American Art and History** (3) Miller

Exploration of selected problems and themes in American cultural history involving the use of artistic materials in different media; emphasis on methodology and analytic techniques. (Spring)

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* May be taken for undergraduate credit with the approval of the instructor.
† May be repeated for credit if the specific area announced is different.
‡ Jointly offering of the Department of Art and the American Studies Program in affiliation with the National Portrait Gallery of the Smithsonian Institution. Students may register under either designation.

289–90 **Thesis Research** (3–3)
(Fall and spring)

FINE ARTS

Unless otherwise indicated, Fine Arts courses taught in University studios carry no material or laboratory fees; students must purchase their own materials. Laboratory and material fees for courses taught at the Corcoran School of Art are stated in the course description and are payable at the School.

Courses taught at the Corcoran School of Art have the designation "Corcoran Faculty" for the instructor.

Departmental prerequisite: Art 21–22 and 41–42 or permission of Department Chairman is prerequisite to all other studio courses in Art.

FIRST GROUP

•21–22 **Design I: Basic** (3–3)
Fundamental studies of principles and elements of design. Art 21: study of two-dimensional design. Art 22: three-dimensional studies. (Art 21 and 22—fall and spring)

23–24 **Fundamentals of Photography** (3–3)
(Formerly Art 161–62)
Fundamental techniques of photography; emphasis on creative expression. Laboratory fee, $25 a semester. (Fall and spring)

41–42 **Drawing I** (3–3)
Concepts of drawing, traditional and contemporary; training in perception, analysis of form, use of media, and exercises in connoisseurship. Material and model fee, $15 a semester. (Art 41 and 42—fall and spring)

51–52 **Ceramics I** (3–3)
Working with clay as an art form. Basic techniques of hand building and wheel throwing. Laboratory fee, $45 a semester. (Academic year)

57–58 **Graphics I** (3–3)
Exploration of the methods of intaglio, relief, printing, and other composite processes. Material fee, $20 a semester. (Academic year)

61–62 **Water Color** (3–3)
Painting in transparent and opaque water color and in acrylic. Experimentation, figurative and landscape. (Academic year)

65–66 **Painting I** (3–3)
Emphasis on personal expression with exposure to a variety of styles and attitudes. Use of acrylics and oils. (Academic year)

81–82 **Sculpture I** (3–3)
Three-dimensional design. Basic sculptural techniques, modeling, carving and construction. Media include wood, clay, stone, plaster. (Academic year)

• Required of all Fine Arts majors

ECOND GROUP

econd-group Art courses may be repeated for credit with approval of Department.

123–24 **Design II: Individual Problems** (3–3) Staff

Emphasis on the individual student and the problems and materials that specifically interest him in any area of design. (Academic year)

*125–26 **Painting II** (3 or 6–3 or 6) Corcoran Faculty

Emphasis on personal expression; exposure to a variety of styles and attitudes. Materials and techniques subordinate to individual experimentation. Use of acrylics and oils. (Academic year)

*127–28 **Painting III** (3 or 6–3 or 6) Woodward

Exploration of problems in developing a personal visual imagery. Material fee each semester: $12 for 3 semester hours; $24 for 6 semester hours. (Academic year)

*131–32 **Ceramics II** (3 or 6–3 or 6) Corcoran Faculty

Development of techniques with emphasis on quality and creativity. Laboratory fee each semester. $45 for 3 semester hours, $60 for 6 semester hours. (Academic year)

135–36 **Advanced Water Color** (3–3) Corcoran Faculty

Development of techniques of water color; concentration on special projects. (Academic year)

137 **Workshop in Materials, Methods, and Techniques** (3) Woodward

Drawing in charcoal, crayon, and pen, painting and preparation of grounds for tempera, encaustic, fresco buono, oil, watercolor, polymer, and mixed techniques; graphic techniques in woodcut, engraving, etching. Material and model fee, $10. (Fall and spring)

143–44 **Serigraphy** (3–3) Teller

Advanced problems in serigraphy; emphasis on its aesthetic possibilities. Prerequisite: Art 57–58. (Academic year)

*151–52 **Ceramics III** (3 or 6–3 or 6) Corcoran Faculty

Development of techniques with emphasis on quality and creativity. Students mix own clay and glazes. Laboratory fee each semester: $45 for 3 semester hours; $60 for 6 semester hours. (Academic year)

*153–54 **Graphics II** (3 or 6–3 or 6) Griffith, Wright

Advanced relief, intaglio, and other composite processes. Prerequisite: Art 57–58. Material fee each semester: $20 for 3 semester hours, $40 for 6 semester hours. (Academic year)

*157–58 **Graphics III** (3 or 6–3 or 6) Griffith

Exploration of combined techniques and mixed media. Prerequisite: Art 153–54. Material fee each semester: $20 for 3 semester hours, $40 for 6 semester hours. (Academic year)

159–60 **Drawing II** (3–3) Wright

Development of drawing. Individual study, application and extensions of drawing. Material fee, $20 a semester. (Academic year)

* Fine Arts majors and Masters of Fine Arts candidates should elect 6 semester hours of credit

163–64 **Design: Visual Communication** (3–3) Corcoran Faculty
Layouts and execution in client-presentation form of various graphic design projects—brochures, bookjackets, displays, title graphics for film, media, etc. (Academic year)

165–66 **Design: Advanced Visual Communication** (3–3) Corcoran Faculty
Design and execution of graphic design projects including magazine spreads, posters, advertisements, trademarks, letterheads, packages. Psychological and symbolic aspects of design solutions. (Academic year)

171 **Calligraphy and Lettering** (3) Corcoran Faculty
Techniques of hand lettering, traditional and contemporary. Exploration of the decorative potential in lettering. (Fall and spring)

172 **Typography and Lettering** (3) Corcoran Faculty
(Formerly Calligraphy and Lettering)
(Fall and spring)

175–76 **Design Projects** (3–3) Corcoran Faculty
Advanced general design problems in two, three, and four dimensions. Unusual media and techniques, pure concept problems stressed. (Academic year)

177–78 **Survey of Printing Illustration** (3–3) Corcoran Faculty
Exposure of a maximum range of illustrative processes, both practical and theoretical. Technical aspects of commercial printing processes, methods of preparation of artwork, photographs, and typographic proofs for commercial reproduction. (Academic year) Gates

•179–80 **Sculpture II** (3 or 6–3 or 6) (Academic year) Lake
Concepts of sculpture, new materials and developments

181–82 **Intermediate Photography** (3–3)
Basic problems. Introduction to color photography with emphasis on creative expression. Prerequisite: Art 23–24 or permission of instructor. Laboratory fee, $25 a semester. (Academic year) Corcoran Faculty

185–86 **Painting and Drawing** (3–3)
Techniques of drawing and painting in oil, acrylic, and water color. Work from life model and still life. (Academic year) Gates

•189–90 **Sculpture III** (3 or 6–3 or 6)
Advanced study concentrating on relevance of scale and media. Relationship of sculpture to the environment. (Academic year) Corcoran Faculty

193–94 **Film Making** (3–3)
Basic techniques and procedures in film making. The student will create his own short film. Laboratory fee, $90 a semester. (Academic year) Lake and Staff

†195 **Documentary Photography** (3)
Social problems, team-taught. Each student will work on projects with social dimensions. Laboratory fee, $25. Admission by permission of instructor. Limited enrollment. (Spring)

• Fine Arts majors and Master of Fine Arts candidates should elect 6 semester hours of studio.
† Interdepartmental course offered by the Department of Art and Journalism.

HIRD GROUP

l third-group Art courses may be repeated for credit with the approval of the epartment.

205 **Advanced Photography** (3) Lake
(Formerly Art 191)
Advanced problems in photography; emphasis on individual development. Prerequisite: Art 181–82 or permission of instructor. Laboratory fee, $25. (Fall and spring)

206 **Photography: Special Projects** (3) Lake
(Formerly Art 192 Advanced Photography: Individual Problems)
Laboratory fee, $25.

*231–32 **Design III** (3 or 6–3 or 6) Gates
New media and techniques in three-dimensional design. (Academic year)

*234 **Design IV** (3 or 6) Staff
Presentation, model building, and specifications of materials in three-dimensional problems. (Fall and spring)

*235 **Design V** (3 or 6) Teller
Designing and executing textiles using the techniques of silk screen, block print, and batik. (Fall and spring)

249 **Theory of Design** (3) Teller
Application of design principles to painting, architecture, sculpture, and minor arts of today. Relationship of design principles to the contemporary artist and his work. Open to undergraduate students with permission of instructor. (Fall)

*251–52 **Ceramics IV** (3 or 6–3 or 6) Corcoran Faculty
Development of techniques with emphasis on quality and creativity. Students mix own clay and glazes. Laboratory fee each semester: $45 for 3 semester hours, $60 for 6 semester hours. (Academic year)

*253 **Ceramics V** (3 or 6) Corcoran Faculty
Laboratory fee: $45 for 3 semester hours; $60 for 6 semester hours. (Fall and spring)

*255–56 **Graphics IV: Serigraphy** (3 or 6–3 or 6) Teller
Prerequisite: Art 157–58. (Academic year)

*257–58 **Graphics V: Etching and Engraving** (3 or 6–3 or 6) Griffith
Prerequisite: Art 157–58. Material fee each semester: $20 for 3 semester hours, $40 for 6 semester hours. (Academic year)

*259 **Graphics VI: Lithography** (3 or 6) Wright
(Fall and spring)

*260 **Graphics VII: Relief Printing** (3 or 6) Griffith
Material fee: $20 for 3 semester hours, $40 for 6 semester hours. (Fall and spring)

* Fine Arts majors and Master of Fine Arts candidates should elect 6 semester hours of credit.

*265–66 **Painting IV** (3 or 6–3 or 6) Woodward

Creative painting; students work on independent projects as well as as signed problems. Material and model fee each semester: $12 for 3 semester hours; $24 for 6 semester hours. (Academic year)

267–68 **Individual Problems in Photography** (3–3) Corcoran Faculty

Students submit to the instructor a written proposal outlining the project to be explored during the semester. Instruction and professional guidance relevant to individual projects. Prerequisite: two years of photography and written permission of instructor. Laboratory fee, $25 a semester. (Academic year)

*275 **Painting V** (3 or 6) Woodward

(Fall or spring) Gates

*279–80 **Sculpture IV** (3 or 6–3 or 6)

(Academic year) Gates

*281 **Sculpture V** (3 or 6) Staff

(Fall and spring)

299–300 **Thesis Research** (3–3)

(Fall and spring)

Art Therapy—Graduate Study

Professor B.I. Levy (*Co-coordinator*)
Adjunct Assistant Professors Hanna Kwiatkowska, Elinor Ulman (*Co-coordinator*)
Assistant Professorial Lecturer Edith Kramer

Master of Arts in Special Studies (*Art Therapy*).—Prerequisite: a Bachelor's degree, evidence of significant training and/or experience in the arts, including painting and ceramic sculpture, course work in the behavioral sciences, including at least two of the following: general psychology, personality theory, abnormal psychology, developmental psychology.

Required: the general requirements, pages 93–100. Prospective candidates should consult Professor Levy for specific requirements.

Fields of Emphasis: Adult Art Therapy, Family Art Therapy, Child Art Therapy and Research.

THIRD-GROUP

The courses listed below are taught at the Washington School of Psychiatry in affiliation with the George Washington University. They are offered, fall or spring, as the demand requires. Ulman

201 **Introduction to Art Therapy** (3)

Lectures, presentation of illustrative case material, class discussion of assigned readings. Survey covering range of art therapy practice, theoretical development, main theoretical trends.

* Fine Arts majors and Master of Fine Arts candidates should elect 6 semester hour[illegible]

202 **Case Studies in Art Therapy** (3) **Ulman**

Case presentations by the instructor and other practitioners; illustrative material will include use of art in diagnosis and treatment of children, adolescents, adults; applications in groups and with individuals.

203 **Techniques of Art Therapy** (3) **Kwiatkowska**

Studio work: useful art therapy approaches to drawing, painting, and ceramic sculpture. Discussion among students of their expressive products. Presentation of case material showing patients' use of the techniques studied.

204 **Art as Therapy with Children** (3) Kramer

Lectures, presentation of case material, class discussion of assigned readings. Special considerations of work in art therapy with children will be explored from theoretical and practical points of view.

205–6 **Family Art Techniques** (3–3) **Kwiatkowska**

Introduction to art techniques used with families for the evaluation of family dynamics, principles of family art therapy as an adjunctive and primary form of treatment.

283 **Practicum in Art Therapy** (3) **Staff**

Field experience. On-the-job supervision supplemented by supervision from the University art therapy staff. May be repeated for credit with approval of adviser.

285 **Special Problems in Art Therapy** (3) Ulman

Individual study based on practicum; details to be worked out with each student. Resource people may be called upon to assist, as appropriate. May be repeated for credit with approval of adviser.

287 **Special Topics in Art Therapy** (3) Staff

Individual project. May be based on practicum experience, research, development of a pilot art therapy program, advanced case study, or other topics. May be repeated for credit.

Astronomy

See "Physics."

Biochemistry

Professors C.R. Treadwell (*Chairman*), B.W. Smith, G.V. Vahouny, J.M. Bailey, Helen Hess

Professorial Lecturers W.W. Burr, Jr. (*Isotopes*), R.W. Albers (*Brain*), Roscoe Brady, Jr. (*Brain*), A.E. Schaefer, Edward Steers, Jr., W.F. Anderson (*Genetics*), Gordon Guroff, Martin Flavin, A.N. Schechter, Steven Levisohn, G.F. Combs

Assistant Professors Glenn Walker, Linda Gallo (*Research*), Barbara Howard (*Research*)

Lecturer P.H. Fishman

Special Lecturers Walter Mertz (*Inorganic Metabolism*), J.C. Smith, Jr.

Master of Science in the field of Biochemistry.—Prerequisite: a Bachelor's degree. The undergraduate program must have included the following courses, or equivalent: B Sc 11–12; Chem 11–12, 22, 51–52, 53–54; Phys 1, 2.

Required: the general requirements, pages 93–100, including Bioc 221–22, 299–300. The remaining courses are to be selected from Bioc 224, 232, 241, 295; or, with the approval of the adviser, from graduate courses in Chemistry, Microbiology, Physiology, or Pharmacology. It is usually not possible to arrange courses and research so that the student can be assured of completing all of the required work in one academic year.

Master of Science in the field of Mycology.—An interdepartmental degree offered by the departments of Biochemistry, Epidemiology and Environmental Health, and Microbiology.

Prerequisite: a Bachelor's degree with a major in Biology, Botany, Chemistry, or Zoology from this University, or an equivalent degree. The undergraduate program should have included the following courses, or equivalent: B Sc 11–12, Chem 11–12, 51–52, 53–54.

Required: the general requirements, page 93–100. Candidates must complete either (1) a minimum of 34 semester hours including Bioc 299–300 *Thesis Research*, or (2) a minimum of 40 semester hours without a thesis. The required courses in the program are Bioc 221–22; Epid 201, 217, 230 (2 semester hours); Micr 201, 231.

Doctor of Philosophy in the field of Biochemistry.—Required: the general requirements, pages 93–97, 100–102.

Research fields. Amino Acid Metabolism; Animal Nutrition; Biochemical Evolution, Biochemistry of Cancer, Biochemistry of Tissue Culture, Carbohydrate Metabolism, Chemistry and Metabolism of Carbohydrates, Lipids, Proteins, Connective Tissue; Lipids; Endocrinology; Intermediary Metabolism; Lipids; Metabolic Relationships of Insulin, Metabolism; Metabolism of Connective Tissue, Metabolism of Purines and Pyrimidines, Neurochemistry, Nutrition; Protein Biosynthesis, Protein Metabolism; Tissue Respiration; and Vitamins.

221–22 **General Biochemistry** (4–5)

Lectures and laboratory. Prerequisite: Chem 52, 54. Material fee, $[illegible] a semester. (Academic year)

224 **Biochemistry of Enzymes** (1)

Biochemistry of enzymes and enzyme reactions. Prerequisite: Bioc [illegible] (Fall) B Smith and [illegible]

225 **Biochemical Procedures** (3)

Laboratory course. Material fee, $16. Content differs each time course is offered, may be repeated for credit. (Fall and spring)

227 **Biochemistry Seminar** (1)

Current literature in biochemistry. Content differs each time course is offered, may be repeated for credit. (Fall and spring)

232 **Proteins and Amino Acids** (1)

Prerequisite: Bioc 221. (Fall)

241 **Isotopes** (3)

Theoretical characterization of isotopes and their applications in [illegible]. Attention given to counting, health physics and radiation safety, [illegible] radiography, chromatography. Laboratory fee, $16. (Spring)

251 **Carbohydrate Metabolism** (1)

Prerequisite: Bioc 222. (1973–74 and alternate years—spring)

252 **Biochemistry of the Brain** (1) Albers, Brady

For medical students; open to limited number of graduate students. Recent biochemical developments in structure, functions, and metabolic processes unique to the brain. (Spring)

254 **Human Nutrition** (1)

For medical students; open to limited number of graduate students. Application of nutritional principles in humans. (Spring)

256 **Biochemistry of Organ Function** (1) N. Kramer*

For medical students; open to limited number of graduate students. Emphasis on biochemical processes unique to particular organ systems, application of these processes to evaluation of function. (Spring)

258 **Inherited Metabolic Diseases** (1) Levisohn

For medical students; open to limited number of graduate students. Contribution of molecular biology to understanding of human mutations and hereditary diseases. Specific disease states and genetics of protein structure discussed. Prerequisite: Bioc 222. (Spring)

260 **Biochemistry of the Steroids** (1) O. Dodek†

For medical students; open to limited number of graduate students. Basic chemistry of the steroids, pathways of biosynthesis and metabolism, regulatory mechanisms, physiologic effects, clinical measurement of endogenous steroids, clinical manifestations of steroid imbalance, steroid changes in pregnancy, and steroid therapy. (Spring)

262 **Biochemistry of the Lipids** (1) Vahouny

1972–73 and alternate years: metabolism of lipids, including digestion, energy production, biosynthesis function in specialized tissues and subcellular structures. 1973–74 and alternate years: chemistry, properties, occurrence of important classes of biological lipids. Content differs each time course is offered, may be repeated for credit. (Spring)

266 **Biochemical Genetics** (1) Anderson

For medical students; open to limited number of graduate students. (Spring)

268 **Biochemistry of Bone and Muscle** (1) Walker

Study of structure, chemistry, and biochemistry as they relate to the normal and diseased states of bone and muscle; emphasis on current theories and techniques. (Spring)

295 **Research in Biochemistry** (arr.) Staff

Participation in a project under investigation in the Department or one in a related field suggested by the student and approved by the Staff. Content differs each time course is offered; may be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

* Dr. Kramer is Associate Professor of Medicine in the School of Medicine.
† Dr. Dodek is Assistant Clinical Professor of Obstetrics and Gynecology in the School of Medicine.

Staff

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

Staff

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Biological Sciences

Professors I.B. Hansen, S.C. Munson, A.H. Desmond (*Chairman*), R.L. Weintraub

Adjunct Professors T.E. Bowman, M.L. Jones, L.S. Kornicker, H.A. Rehder, F.A. Chace, Jr., Raymond Manning

Professorial Lecturers K.C. Kates, L.B. Smith, R.S. Sigafoos, W.A. Shropshire, Jr.

Associate Professors Kittie Parker, S.O. Schiff

Adjunct Associate Professors R.F. Cressey, W.D. Hope, D.L. Pawson, Joseph Rosewater, C.F. Roper, Mary Rice

Assistant Professors W.G. Nash, D.L. Atkins, Henry Merchant, R.K. Packer

Adjunct Assistant Professor P.E. Spiegler

Assistant Professorial Lecturers Jessie Dickens, Isabel Griffith, Barbara Timberlake

Lecturers Dee Ann Houston, Clare Crandall

Bachelor of Arts or *Bachelor of Science with a major in Biology, Botany, or Zoology (Departmental).*—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Social Studies and the Humanities.)

2. Prerequisite courses—B Sc 11–12, or equivalent.

3. Required courses in related areas—Chem 11–12; Chem 51–52 and 53–54, or 50. (The following courses are strongly recommended: Math 31; Phys 1, 2; two years of French, German, or Russian; Stat 91.)

4. (a) Required courses for the major in Biology—a minimum of 24 semester hours of second group courses, which should include at least 6 hours in Biology; 6 in Botany; 6 in Zoology.

(b) Required courses for the major in Botany—a minimum of 24 semester hours of second-group courses in Botany or a combination of Botany and Biology.

(c) Required courses for the major in Zoology—a minimum of 24 semester hours of second-group courses in Zoology or Biology.

Master of Science in the field of Biology, Botany, or *Zoology.*—Prerequisite a Bachelor's degree with a major in one of the following from this University, or an equivalent degree: (1) *Biology field*—an undergraduate major in Biology, Botany, or Zoology; (2) *Botany field*—an undergraduate major in Botany or Biology; (3) *Zoology field*—an undergraduate major in Zoology or Biology. The undergraduate program must have included the following courses, or equivalent: Chem 51–52 and 53–54, or 50; Math 31; Phys 1, 2.

Required the general requirements, pages 93–100. The minimum requirement consists of 24 semester hours of approved course work plus a thesis (equivalent to 8 semester hours). With the permission of the Department a student may elect a program of study consisting of 36 semester hours of approved course work without a thesis.

Doctor of Philosophy in the field of Biology, Botany, or Zoology.—Required: the general requirements, pages 93–97, 100–102. The program of study is determined in consultation with the graduate committee of the Department. Each candidate is required to pass the General Examination in four areas which support the field of study selected. The required courses and tool subject options vary with the field of study undertaken.

Research fields in Biology: Cell Physiology, Cytogenetics, Cytology, Development Genetics, and Molecular Genetics.

Research fields in Botany: Photobiology, Plant Ecology, Plant Physiology (Microorganisms), Plant Physiology (Vascular Plants), and Taxonomy.

Research fields in Zoology: Animal Ecology; Bioenergetics; Comparative Neuroanatomy; Comparative Physiology; Entomology (Insect Physiology); Herpetology; Histophysiology; Radiation Biology; Taxonomy, Anatomy, and Physiology of Mollusks; Vertebrate Anatomy and Taxonomy; Vertebrate Embryology and Morphogenesis; Vertebrate Ichthyology; and Vertebrate Physiology.

Doctor of Philosophy in the field of Biophysics (an interdepartmental field offered by the departments of Biological Sciences, Physics, and Physiology), see page 232. See pages 93–97, 100–102, for requirements for the degree

Bachelor of Arts in Education with a teaching field in Biology.—Prerequisite: the Education curriculum, pages 80–81.

Required: the Biology option and the professional courses listed on pages 111, 119.

Departmental prerequisite: B Sc 11–12 or equivalent is prerequisite to all second-group courses in Biology, Botany, and Zoology, except by permission of the instructor.

BIOLOGY

FIRST GROUP

3–4 **Introductory Biology for Nonscience Majors** (3–3) Schiff

Lecture (2 hours), laboratory (2 hours). Survey of biological principles; emphasis on man as a functional organism in his environment. Material fee, $12 a semester. (Academic year)

11–12 **Introductory Biology for Science Majors** (4–4) Merchant

Lecture (3 hours), laboratory (3 hours). Biological principles and problems designed to furnish a base for advanced studies in biology and related sciences. Material fee, $15 a semester. (Academic year)

*26 **Environmental Issues** (3) Pederson, Schiff

An interdisciplinary analysis of selected aspects of the population question, pollution and human health, urban environmental problems, issues of economic growth and development, technology and public policy. (Spring)

SECOND GROUP

108 **Organic Evolution** (3) Munson

Theories of organic evolution and present ideas on principal lines of development in the plant and animal kingdoms, review of mechanisms involved in the process. (Fall and spring)

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* Offered jointly by the Office of Program Development and the departments of Biological Sciences and Geography and Regional Science

111 Introductory Microbiology (4)
Lecture (2 hours), laboratory (4 hours). Survey of the major groups of microorganisms with emphasis on structure, physiology, ecology, phylogenetic relationships, and economic importance. Prerequisite: one year of chemistry. Material fee, $15. (Fall)

115 Cytology (4)
Lecture (2 hours), laboratory (4 hours). Structure and function of cells, analysis of chromosomes, cytological techniques and preparation of slides. Recommended: one year of chemistry.

118 Advanced Cytology (3)
Lecture (1 hour), laboratory (4 hours). Mechanisms of cell action. Laboratory consists of a project to be selected by the student with concurrence of the instructor. Prerequisite: B Sc 115. Material fee, $15.

122 Cell and Molecular Biology (3)
Survey of structure and function of cells of animals, plants, and microorganisms and their subcellular organelles, including study of the processes of cellular absorption, excretion, biosynthesis, growth, and division. Prerequisite: one semester of organic chemistry. (1973–74 and alternate years—fall)

123 Cell Biochemistry (3)
(This course together with B Sc 124 replaces former B Sc 119.)
Introduction to the metabolism of generalized cells of animals, plants, and microorganisms, including energetics, enzymes, respiration, biosynthesis, and regulatory mechanisms. Prerequisite: one semester of organic chemistry. (1973–74 and alternate years—spring)

124 Cell Biochemistry Laboratory (1)
(This course together with B Sc 123 replaces former B Sc 119.)
Designed to illustrate some of the principles and techniques of biochemical experimentation. Prerequisite or concurrent registration: B Sc 123. Material fee, $18. (1973–74 and alternate years—spring)

127 Genetics (4)
Lecture (3 hours), laboratory (2 hours). Introductory course. Basic aspects of transmission of genetic traits with particular reference to the chemical basis of heredity and gene action. Material fee, $12. (Fall and spring)

129 Cell Physiology (3)
(This course together with B Sc 130 replaces former B Sc 120.)
Study of cell processes, including growth, division, differentiation, reactions, aging, movements, energy perception and transduction, luminescence. (1972–73 and alternate years—spring)

130 Cell Physiology Laboratory (1)
(This course together with B Sc 129 replaces former B Sc 120.)
Exercises to illustrate some principles and techniques. Prerequisite: concurrent registration: B Sc 129. Material fee, $18. (1972–73 and alternate years—spring)

138 **Advanced Genetics** (3) Nash

Emphasis on the use of genetic analysis in solving modern biological problems. Prerequisite: introductory course in genetics. (Spring)

167 **Radiation Biology** (3) Schiff

Chemical, physical, and biological aspects of radiation; effects of radiation on cells and organisms, with emphasis on mammals; genetic effects. Recommended: two years of biological sciences, and chemistry or physics. (Fall)

171 **Undergraduate Research** (ART.) Staff

Admission by permission of the staff member concerned. May be repeated for credit. Material fee, $15. (Fall and spring)

172 **Independent Study in Cell and Molecular Biology** (2) Staff

Prescribed reading list and consultations with staff adviser culminating in a written report and/or examination. (Fall)

173 **Independent Study in Developmental Biology** (2) Staff

Prescribed reading list and consultations with staff adviser culminating in a written report and/or examination. (Fall)

174 **Independent Study in Organismic Biology** (2) Staff

Prescribed reading list and consultations with staff adviser culminating in a written report and/or examination. (Fall)

175 **Independent Study in Genetic and Evolutionary Biology** (2) Staff

Prescribed reading list and consultations with staff adviser culminating in a written report and/or examination. (Fall)

176 **Independent Study in Environmental Biology** (2) Staff

Prescribed reading list and consultations with the staff adviser culminating in a written report and/or examination.

177 **Laboratory Techniques, Instrumentation, and Data Analysis** (3) Staff

Theory and practice in experimental design; techniques and instrumentation used in biological research laboratories.

181–82 **Senior Seminar** (1–1) Staff

Lectures and discussions on current biological problems. (Academic year)

IRD GROUP

206 **Seminar: Radiation Biology** (3) Schiff

Actions of radiation at subcellular, cellular, and organismal levels, factors modifying radiation damage, practical considerations in radiation exposure. Prerequisite: B Sc 167 or equivalent. (Spring)

207 **Seminar: Origin of Life** (3) Weintraub

(1972–73 and alternate years—spring)

220 **Seminar: Cell Physiology** (3) Shropshire
Review in depth of selected topics. May be repeated for credit.
(1972-73 and alternate years—fall)

222 **Seminar: Topics in Molecular Biology** (3) Weintraub
(1973–74 and alternate years—spring)

227 **Seminar: Genetics** (3) Nash
(Fall)

255 **Seminar: Consortium Biology** (2)
Topic to be announced in *Schedule of Classes.* (Spring)

295 **Research** (arr.) Staff (Fall
Investigation of special problems. May be repeated for credit.
and spring)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general e
amination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credi
(Fall and spring)

BOTANY

SECOND GROUP

105 **Local Flora** (4) Parke
Lecture (2 hours), laboratory and field (4 hours). Field and laborato
studies on local flora; emphasis on the woody plants. Material fee, $5
(Fall)

106 **Field Botany—Lower Plants** (4) Parke
Lecture (2 hours), laboratory and field (4 hours). Primarily for no
specialists, emphasizing algae, mosses, and ferns. Material fee, $5.
(Spring)

109 **Structure of Seed Plants** (4) Sh
Lecture (2 hours), laboratory (4 hours). Morphology, anatomy, a
histology of seed plants. Material fee, $12. (Fall) Sh

110 **Lower Plants** (4)
Lecture (2 hours), laboratory (4 hours). Structure, life cycle, phyloge
ecology, and economic importance of algae, fungi, mosses, and ferns.
terial fee, $12. (Spring)

125 **Flowering Plants** (4) Parker

Lecture (2 hours), laboratory and field (4 hours). Origin, evolutionary development, and principles of systematics of flowering plants. Material fee, $8. (Spring)

132 **Mycology** (4)

Lecture (2 hours), laboratory (3 hours). Material fee, $12. (Fall)

134 **Plant Pathology** (4)

Lecture (2 hours), laboratory (3 hours). Material fee, $12.

135 **Plant Physiology** (4) Weintraub

Lecture (2 hours), laboratory (4 hours). Physiology of seed plants with emphasis on growth, development, tropisms, and reproduction. Prerequisite: Chem 11–12. Recommended: Chem 50 or 51–52. Material fee, $15. (1972–73 and alternate years—spring)

141 **Plant Ecology** (4) Sigafoos

Lecture (2 hours), laboratory (4 hours). Material fee, $5. (1972–73 and alternate years—fall)

THIRD GROUP

221 **Seminar: Systematics** (3) Parker

(Formerly Seminar: Plant Taxonomy)

Review of current work in various disciplines of systematic research; topics of special interest to participants. (1973–74 and alternate years—fall)

235 **Seminar: Plant Physiology** (3)

242 **Seminar: Plant Ecology** (3) Sigafoos

(1973–74 and alternate years—spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

ZOOLOGY

SECOND GROUP

101–2 **Invertebrate Zoology** (3–3) Staff

Lecture (1 hour), laboratory (4 hours). Systematic study of invertebrate forms, including morphology, physiology, classification, life histories, and phylogenetic relationships. Material fee, $15 a semester. (Academic year)

104 **Comparative Vertebrate Anatomy** (4) Atkins

Lecture (2 hours), laboratory (4 hours). Evolution and comparative morphology of vertebrates, stressing recent forms. Material fee, $15. (Fall and spring)

140 **General Ecology** (4) Merchant

Lecture (3 hours), laboratory and field (3 hours). Introduction to the concepts of limiting factors, biogeochemical cycles, trophic levels, and

energy transfer, and their relationship to the structure and function of populations, species, communities, and ecosystems. Material fee, $12. (Fall)

Merchant

143 Animal Ecology (4)

Lecture (3 hours), laboratory and field (3 hours). Application of ecological principles to the understanding and manipulation of animal populations. Prerequisite: B Sc 140 or permission of instructor. Laboratory fee, $12. (Spring)

Staff

144 Aquatic Ecology (4)

Lecture (3 hours), laboratory and field (3 hours). Principles applied to aquatic systems with special references to physicochemical properties, typical habitats and communities. Prerequisite: B Sc 143 or permission of instructor. Laboratory fee, $12. (Spring)

Hansen

145 Introduction to Vertebrate Embryology (3)

Lecture (1 hour), laboratory (4 hours). Origin and early development of the individual, formation of organ systems. Emphasis on frog, chick and pig, with reference to human embryo. Material fee, $12. (Fall and spring)

Desmarais

148 Histology (4)

Lecture (2 hours), laboratory (4 hours). Introduction to microscopical anatomy of normal tissues and organs with emphasis on the interrelationship of structure and function. Material fee, $12. (Fall and spring)

Staff

152 Protozoa (3)

Lecture (1 hour), laboratory (4 hours). Introduction to protozoa: classification, life histories, genetics, and physiology; emphasis on free-living types. Material fee, $12. (1973–74 and alternate years—spring)

Atkins

154 Vertebrate Zoology (4)

Lecture and discussion (2 hours), laboratory and field (4 hours). Vertebrate natural history and systematics, emphasizing higher and transitional taxa. Prerequisite: B Sc 104. Material fee, $12. (Spring)

Kates

155 Parasitology (3)

Lecture (1 hour), laboratory (4 hours). Introduction to animal parasitology; survey of parasitic types from protozoa through arthropods. Material fee, $12. (1972–73 and alternate years—fall)

Desmond

157 Comparative Endocrinology (3)

Comparative study of basic principles of chemical integration, neuroendocrine relationships, and mechanisms of hormone action. (Spring)

Minnich

161 Entomology (3)

Lecture (2 hours), laboratory (2 hours). Elementary morphology, physiology, and ecology of insects; introduction to taxonomy of more important groups. Material fee, $12. (Fall)

Munson

162 Insect Physiology (3)

Lectures and laboratory on physiology of insects. Admission by permission of instructor. Material fee, $12. (Spring)

163 **Human Physiology** (4) — Packer

Lecture (3 hours), laboratory (3 hours). Introduction to the function of organ systems of the human body. Material fee, $15. (Fall)

164 **Vertebrate Physiology** (4) — Packer

Lecture (3 hours), laboratory (3 hours). Detailed study of selected organ systems, stressing chemical and physical bases. Prerequisite: B Sc 163 or equivalent. Prerequisite or concurrent registration: Chem 51–52 or 50. Material fee, $15. (Spring)

IRD GROUP

204 **Seminar: Invertebrate Zoology** (3) — Staff

Study of original publications on hormones of invertebrate animals. (Fall)

*205 **Comparative Pathology** (3) — Zook

An introduction to the study of disease and disease mechanisms in vertebrates, and comparison with disease in man. Recommended: courses in anatomy, histology, and physiology. (Fall)

245 **Histochemistry** (3) — Desmond

Theory and application of chemical techniques in determining changes in the amount and distribution of inorganic and organic constituents of tissues during different physiological and pathological conditions.

247 **Morphogenesis** (3) — Hansen

Lectures and reports on experimental morphology. Emphasis on early embryonic development. Prerequisite: B Sc 145 or equivalent. (1973–74 and alternate years—spring)

250 **Seminar: Regeneration** (3) — Hansen

Discussions and reports on theories and experimental evidence in both vertebrate and invertebrate animals. (1972–73 and alternate years—spring)

251 **Seminar: Vertebrate Zoology** (3) — Desmond

Study of current publications in the field of histophysiology. (1972–73 and alternate years—spring)

265 **Comparative Animal Physiology** (3) — Packer

Survey of the physiological basis of adaptation of animals to diverse environments, emphasis on nonmammalian vertebrates. Prerequisite: B Sc 164 or equivalent. (Fall)

299–300 **Thesis Research** (3–3) — Staff

(Fall and spring)

Biology

See "Biological Sciences."

* An interdepartmental course offered by the departments of Biological Sciences and Pathology.

Biophysics—Graduate Study

COMMITTEE ON BIOPHYSICS

C.S. Tidball (*Chairman*), A.H. Desmond, Marvin Eisenberg, Julian Eisenstein, M.J. Jackson, Herbert Jehle, D.W. Watkins

The Graduate School of Arts and Sciences offers an interdepartmental program leading to the degree of Doctor of Philosophy in the field of Biophysics. This interdepartmental program is directed by the departments of Biological Sciences, Physics and Physiology. Entry into this program may be made through any one of these departments; however, the final program must be approved by the Committee on Biophysics. Interested students should consult either the Chairman of the Committee on Biophysics or the chairman of the department of Biological Sciences, Physics, or Physiology.

No field of undergraduate study is stipulated; however, the undergraduate program must have included the following courses, or equivalent: B Sc 11–12; Chem 22; Math 33; Phys 32, 52. In addition, candidates should present advanced undergraduate work in either chemistry, mathematics, or physics.

Doctor of Philosophy fields of study in Biophysics: Electron Microscopy, Experimental Biophysics, Instrumentation, Membrane Physics, Membrane Transport, Molecular Biology, Neurobiology, and Theoretical Biophysics.—See pages 93–97, 100–102, for requirements for the degree.

The courses to be taken prior to the General Examination will normally be selected from the appropriate course offerings in the departments of Anatomy; Applied Science; Biochemistry; Biological Sciences (Biology and Zoology); Chemistry; Civil, Mechanical, and Environmental Engineering; Electrical Engineering and Computer Science; Mathematics; Microbiology; Pharmacology; Physics; Physiology and Statistics.

Botany

See "Biological Sciences."

Business Administration

Professors J.L. Jessup, J.C. Dockeray, R.B. Eastin, H.R. Page (*Chairman*), Frederick Amling, Guy Black, P.D. Grub

Professorial Lecturers L.C. Collins, R.A. Kaye, K.F. McClure, J.P. Murphy, J.F. Doubleday, W.G. Torpey

Associate Professors E.R. Magruder, Rodney Eldridge, R.F. Hartley, R.A. Barrett, G.P. Lauter, S.F. Divita, G.F. Conner, J.R. Roman, Jr.

Associate Professorial Lecturers W.G. Wells, Jr., J.F. Regan, R.W. Hagauer, J.C. Susbauer, P.L. Foster, P.M. Dickie, Bruce Benefield

Assistant Professors S.N. Sherman, P.A. Schulkin, Norma Loeser, R.F. Dyer

Assistant Professorial Lecturers G.J. Glassman, N.R. Harbaugh, L.R. Brown, J.G. Birdsong, P.M. LoRusso, I.L. Mueller, J.R. Potter, Jr.

Instructor R.A. Oliver

Programs of study in Business Administration leading to the degrees of *Bachelor of Business Administration, Master of Business Administration,* and *Doctor of Business Administration* are offered by the School of Government and Business Administration (see pages 131–60).

FIRST GROUP

51 Introduction to Business (3) Page

Structure, activities, and problems of business enterprise; its contribution to the individual and to society; careers in business. (Fall and spring)

61 Personal Finance (3)

Management of personal and family income and expenses; consumer spending, budgeting, home buying, credit buying, borrowing, banking, saving and investing, insurance and estate planning, taxation. (Fall and spring)

SECOND GROUP

101 The Business Environment (3) Timbers, Divita

Economic and legal environment of business enterprise; social and political influences; contemporary problems and issues. (Fall and spring)

102 Fundamentals of Management (3)

Planning, organizing, directing, coordinating, and controlling activities of the administrative unit; evolution of management thinking. (Fall and spring)

104 Small Business Management (3)

Essentials of operating a small business; required records and reports, resolution of day-to-day problems, sources of assistance to small businesses. Offered primarily as a service to the business community; open to degree candidates with the approval of the adviser. (Spring)

105 Personnel Management (3) Barrett, Loeser

The labor force and labor markets. Industrial personnel and manpower programs, organization and policy in personnel activities. (Fall and spring)

106 Problems in Personnel Management (3) Loeser, Magruder

Principles and problems of personnel management and industrial relations illustrated by cases drawn from industry and government. Prerequisite: B Ad 105. (Fall)

107 Collective Bargaining (3) Barrett

American unionism and collective bargaining; economic, social, and public policy considerations. The negotiation and administration of collective bargaining agreements. Prerequisite: B Ad 105 or permission of instructor. (Spring)

109 Office Management (3)

Organization and management of the office, office and information systems, planning and execution of work, systems analysis, supervision problems.

113 **Real Estate** (3)

Principles of urban real estate practice; leasing and property management, valuation, appraisal, financing, taxation, urban growth, urban renewal. (Fall)

121 **Fundamentals of Insurance** (3) Doubleday, Wells

Function of insurance in the economic life of business and individuals. risk planning, conservation, management. (Fall)

122 **Insurance Estate Planning** (3) Doubleday

Estate programming, role of insurance in providing protection and estate development, disposition of the individual estate. (Spring)

131 **Business Finance** (3) Amling, Foster, Schulkin

Analyzing capital requirements and methods of acquiring funds; planning efficient use of capital. Asset management, financial analysis, sources of funds, capital budgeting, stockholder relationships. Prerequisite: Acct 1–2 Econ 1; Math 30, 31; Stat 51. (Fall and spring)

132 **International Business Finance** (3) Eldridge

Principles, practices, problems, and institutions of international finance. Emphasis on international financial markets, exchange rates, balance-of payments restraints, and governmental policies. Prerequisite: B Ad 131 (Fall)

133 **Capital Formation** (3) Eldridge, Schulkin

The process of capital formation in a free enterprise economy. Roles of business firms, financial intermediaries, money and capital market institutions, governmental regulatory agencies, fiscal and monetary policies. Prerequisite: B Ad 131. (Spring)

135 **Managerial Finance** (3)

Functions and objectives of financial management; problems of internal financial analysis, forecasting, planning, and control; management of corporate capital; problems of capital supply. Prerequisite: B Ad 131. (Spring)

138 **Investment and Portfolio Management** (3) Amling, Foster

Theory and principles of security analysis and portfolio management, including analysis of the national economy, industry, company, and security markets. Risk-reward and computer-aided analysis. Prerequisite Acct 1–2, B Ad 131. (Fall and spring)

141 **Basic Marketing Management** (3) Divita, Hartley

Marketing and marketing management, consumer and demand analysis retailing, wholesaling. Emphasis on major decision areas and tools. Prerequisite: Econ 1–2. (Fall and spring)

143 **Marketing Research** (3) Hartley

Principles and practices of marketing research; emphasis on basic methods and techniques, sources and interpretation of data, and presentation of results. Prerequisite: B Ad 141. (Spring)

144 **International Marketing Management** (3) Lauter

Analysis of the international marketing position of the United States, char-

nels for international marketing, international advertising media, legal aspects, foreign market surveys, development of policies. (Fall)

145 **Sales Management** (3) Hartley, Waldrip

Organization of sales department, sales planning and forecasting, quotas, territories, performance standards, and analysis and control of distribution costs. Prerequisite: B Ad 141. (Fall)

147 **Advertising** (3) Hartley

Advertising as a function of marketing and merchandising; uses and limitations, evaluation, criticism, and control of advertising. (Spring)

158 **Physical Distribution Management** (3) Potter

Distribution from shipper's point of view: problems of plant location, inventory control, warehousing; traffic management emphasized, including private carriage. Prerequisite: Econ 1–2. (Fall)

161 **Commercial Law: Contracts, Sales, Agency, Bailments** (3) Collins, McClure, Murphy

(Fall)

162 **Commercial Law: Negotiable Instruments, Property, Mortgages** (3) Collins, McClure Murphy

(Spring)

163 **Law in Relation to the Form of Business Units: Corporations, Partnerships, and Trusts** (3) Murphy

171 **Principles of Transportation** (3) J. Roman

Impact of intercity transportation systems on society. Emphasis on modal differences in development, economic characteristics, and regulation. Prerequisite: Econ 1–2. (Fall)

172 **Public Utilities** (3)

Legal and economic meaning of public utility concept; development, services, economic characteristics, rate-making, and regulation with emphasis on electric, gas, and telephone industries. Prerequisite: Econ 1–2. (Spring)

173 **Transportation Systems Management** (3) J. Roman

Comparative study, from the standpoint of various carrier modes, of management problems common to all modes of domestic and international transportation. Prerequisite: Econ 1–2. (Spring)

174 **Urban Transportation** (3) J. Roman

Problems of developing balanced transportation systems for urban areas—area needs, modal evaluation, cost effectiveness, finance, and marketing. Prerequisite: Econ 1–2 or equivalent. (Fall)

175 **Introduction to Foreign Trade** (3) Kaye, Waldrip

Physical movement of goods in international business; conditions essential for successful trading; export shipment, documentation, procedural problems. Emphasis on ocean marine insurance and export traffic management policy. Prerequisite: Econ 1–2. (Fall and spring)

176 **International Business Theory and Policy** (3) Eldridge

Relationships underlying international business transactions, role of government, international agreements between private producers, trade with developing nations, policy. Prerequisite: Econ 1–2. (Spring)

177 **Foreign Markets** (3)

Patterns of world trade by countries and commodities, selected regional analysis, and in-depth market studies. Prerequisite: B Ad 144 or permission of instructor. (Spring)

178 **Management of International Business Operations** (3) Dickie, Grub, Waldrop

Analysis of overseas projects according to purpose and type of organization; development and management of overseas operations in different world areas. Prerequisite: B Ad 175 or permission of instructor. (Spring)

181 **Manufacturing Production** (3) Page, Oliver

Basic principles and methods of manufacturing production. Manufacturing facilities, plant and equipment. Illustrations selected from various process and fabrication industries. (Fall and spring)

191 **Business Reports and Analyses** (3)

Sources of management information, array and analysis of data, interpretation and presentation of findings.

193 **Management Communication** (3)

Problems of communication; written communication, style and format; oral communication, oral briefing and presentation, group leadership; completed staff work, related subjects. Eastm

198 **Case Problems in Management** (3)

Principles and techniques of management illustrated by cases drawn from business and industry. Prerequisite: B Ad 102, 105, 131, 141. (Fall and spring)

199 **Individual Research** (3)

Assigned topics. Admission by permission of adviser. May be repeated once for credit. (Fall and spring)

THIRD GROUP Divita

201 **Social Environment of Business** (3)

Contemporary social forces acting on business management; business responsibility, ethics. (Fall) Timber

202 **Relations of Government to Business** (3)

Regulatory and promotional activities of the government, independent regulatory agencies, antitrust activities, monetary and fiscal policy, regulation of labor-management relations. (Spring) Timber

203 **Legal Environment of Business** (3)

Business under the U.S. Constitution, federal legislation, legal precedents and agency orders. Major emphasis on court decisions relating to business. (Spring)

208 **Personnel Management and Industrial Relations** (3) — Barrett, Magruder

Survey of personnel management practices and procedures, including labor-management relations. (Fall)

209 **Seminar: Personnel Management** (3) — Eastin

Industrial personnel and manpower management, research in advanced problems. (Spring)

210 **The Personnel Manager** (3) — Jessup

The personnel manager and his place in the organization, relation to other executives, policy role and relations with chief executive. Problems of the senior personnel executive. Prerequisite: B Ad 208 or permission of instructor. (Spring)

211 **Leadership and Executive Development** (3) — Grub, Loeser

Theories of managerial leadership; issues and problems associated with leadership in large organizations and at higher management levels; executive selection and development. Prerequisite: Mgt 201 or permission of instructor. (Fall and spring)

212 **Unionism and Collective Bargaining** (3) — Barrett

The American labor movement. Collective bargaining and the conduct of labor relations under collective bargaining agreements. (Fall)

213 **Current Issues in Unionism, Collective Bargaining, and Labor Relations** (3) — Barrett

Current problems and issues. Prerequisite: B Ad 212. (Spring)

215 **Seminar: European Common Market** (3) (Same as Law 541 (2))

217 **Seminar: International Technical and Economic Assistance** (3) (Same as Law 543 (2))

218 **Legal Aspects of International Business Transactions** (3) (Same as Law 427 (2))

225 **Seminar: Manufacturing Production** (3) — D. Roman, Oliver

Production technology, including new processes, materials, products, equipment, and facilities. Implications of emerging technology in managing the production function. Prerequisite: B Ad 181 or permission of instructor. (Spring)

231 **Financial Decision-making** (3) — Amling, Schulkin

Functions and objectives of financial management, asset management, problems of internal financial analysis, rate-of-return analysis, financial forecasting, problems of capital demand and supply. Prerequisite: Acct 115 or equivalent, B Ad 131. (Fall and spring)

232 **Capital Resource Management** (3) — Amling, Schulkin

Problems of capital acquisition, costs, rationing, structure; dividend policy. Prerequisite: B Ad 231. (Fall)

...ents registering for B Ad 215, 217, or 218 make special arrangements with the instructor for ...entary assignments equivalent to one additional semester hour. For description of the courses, ... *National Law Center* catalogue.

233 **International Business Finance** (3) Eldridge

Analysis of problems in international business finance. Impact of the evolving international payments system on business. Prerequisite: B Ad 131 or equivalent. (Spring)

234 **Seminar: Capital Formation** (3) Eldridge

Determinants of saving and investment, timing of corporate security issues, analysis of current capital market conditions. Prerequisite: B Ad 131 or equivalent. (Fall)

235 **Financial Management** (3) Dockeray, Amling

Problems of financial management; planning financial structure, obtaining and managing capital, issuing and placing securities, administering income security arrangements. Prerequisite: Acct 215, Mgt 201. (As arranged)

237 **Investment Analysis** (3) Dockeray, Hagauer, Amling

Risk-reward analysis of security investments including analysis of national economy, industry, company, and market; introduction to portfolio management; emphasis on theory and computer methods. Prerequisite: B Ad 131. (Fall and spring)

238 **Seminar: Investment and Portfolio Management** (3) Dockeray, Hagauer, Amling

Portfolio management theory, application, and computer modeling. Independent research on investment analysis and portfolio management with emphasis on theory, cases, and computer applications. Prerequisite: B Ad 237.

241 **Marketing Management** (3) Lauter, Divita

Marketing management problems; market segmentation, product planning, channels of distribution, advertising, personal selling, sales promotion, pricing and development of integrated marketing programs. (Fall and spring)

243 **Seminar: Marketing Research** (3) Hartley

Research as an aid to decision-making and increased efficiency in marketing, marketing research process, critical appraisal of methods and results applications. (Fall)

246 **Consumer Behavior** (3) Hartley

Consumer decision-making in the market place; research in pertinent interdisciplinary studies in psychology, sociology, and other behavioral fields present and potential applications for marketing. (Fall)

247 **Current Issues in Marketing** (3)

Primarily for doctoral students. Theoretical and practical issues in the development of a comprehensive and interrelated body of knowledge in marketing. Impact of current political, economic, and social trends (Fall) Lauter

248 **International Marketing** (3)

Organization for international marketing, demand analysis, product development and policies, marketing structure and trade channels, advertising and promotion problems and policies, pricing, and legal aspects. Effective international marketing strategy. (Spring)

249 **Marketing Policy** (3)

(*Formerly Seminar: Comparative Marketing*)

Primarily for doctoral students. Analysis of complex marketing problems involving policy and operational decisions; emphasis on creative marketing strategy. Case development with local companies. (Spring)

250 **Marketing to the Government** (3)

Overview of government R&D and systems markets. Government acquisition process, buyer behavior, market research, technological planning and the bid decision, field sales force management, proposals, market strategy, pricing strategy, product-line strategy. (Fall)

253 **Distribution Logistics** (3) Potter

Problems of physical distribution and supply of goods. Role of logistics in the economy and the business firm, transportation rates and services, location theory and problems, service standards, inventory control, information flow, scheduling, allocation, warehousing, traffic, and logistics system organization. (Spring)

255 **International Trade** (3) Grub, Eldridge

Public and private foreign trade institutions; principles and theories of international trade; role of foreign trade and investment in U.S. balance of payments; problems and changing patterns in the Western Hemisphere (Fall)

256 **Seminar: International Trade** (3) Grub, Eldridge

Problems arising from economic integration; emphasis on European Economic Community; U.S. trade with developing nations; East-West trade problems and potential; foreign trade policy. Prerequisite: B Ad 255 or permission of instructor. (Spring)

257 **Operation of the Multinational Firm** (3) Dickie, Grub

International market entry and expansion; operating policies, procedures, and problems of multinational companies; developing executives for international business. Prerequisite: advanced Master's degree standing (Spring)

258 **Colloquium on International Business** (3) Grub

Primarily for doctoral students. Selected problems in international business with emphasis upon regionalism, trade barriers, investment incentives, international organization, foreign aid and development assistance and its relation to trade with developing nations, and trade with the Communist Bloc. (Fall)

259 **Comparative Business Management** (3) Lauter

Primarily for doctoral students. Comparative analysis of business practices and management in different countries and economic systems. Generic characteristics of management and of business enterprises and how these are modified in different environments. Influence on the level of economic development, social structure, history, and culture of a country Prerequisite: Mgt 201 or equivalent. (Spring)

260 **Economics for Management** (3)

Economic theory and its application in managerial decision-making; price theory, income and employment theory, related topics. Review of economic methodology.

261 **Managerial Microeconomics** (3) Black, Holland
(*Formerly Managerial Economics I*)
Applications of economic theory and statistics to business decisions involv ing demand, production, cost, profits, investments, and inventories. Pre requisite: Econ 217, Mgt 203, Stat 111 and 112; or equivalent; or per mission of instructor. (Fall and spring)

262 **Managerial Macroeconomics** (3) Black, Holland
(*Formerly Managerial Economics II*)
Use of economic theory and statistics in business forecasting; interpre tation of economic trends and developments; analysis of governmental economic policies. Prerequisite: Econ 218, Mgt 203, Stat 111 and 112 or equivalent; or permission of instructor. (Fall and spring)

264 **Economics of Production** (3) Black
Economics of production and manufacturing. Production functions; opti mization of input mix with simple, multistage, and joint production; tech nological change, risk, uncertainty, progress functions. Prerequisite: Econ 101 or 217, Stat 111, college algebra or Mgt 203. (Fall)

265 **Seminar: Managerial Economics** (3) Black
Primarily for doctoral students. Special topics and applications of ana lytical tools to business decision-making and policy. Prerequisite: B Ad 261, 262; or permission of instructor.

275 **Seminar: Transportation** (3) J. Roman
Problems and special areas of interest in transportation. Prerequisite: B Ad 171 or permission of instructor. (Spring)

279 **Purchasing and Materials Management** (3) Page, Sherman
Industrial purchasing and materials management principles and practices. Organization and functions in materials management. Determination of requirements, source selection, buying practices, policies, and ethics. (Fall)

280 **Procurement and Contracting** (3) Sherman, Benefiel
Overview of procurement and contracting; emphasis on federal govern ment buying policies, practices, and procedures. (Fall)

282 **Government Contract Administration** (3) Sherman
Surveillance over contractor performance of contract. Rights and obli gations: changes, suspension of work, default, convenience termination, inspection, warranties, procedures for the settlement of controversies on government contracts. Prerequisite: B Ad 280 or permission of instructor. (Fall)

283 **Pricing and Negotiation** (3) Sherman
Scope and objectives of negotiated procurement; preparation, conduct and recording of negotiations; analysis of cost, price, profit, investment, and risk; cost principles; incentives; relationship of contract type to work requirements; techniques of negotiation. Prerequisite: B Ad 280 or per mission of instructor. (Fall)

284 **Procurement Data Management** (3) Sherman
Technical data and the procurement process; contract-controlling docu mentation, patent rights, rights in data, requirements determination and

the acquisition of data, federal policies, contractor interests. Configuration management; control of changes. Prerequisite: B Ad 280 or permission of instructor.

285 **Systems Procurement and Project Management** (3) D. Roman, Divita

Development and procurement of major systems. Project management. Procurement planning—from concept formulation through contract definition, development, and manufacture. Prerequisite: B Ad 280 or permission of instructor.

286 **Government Contracts** (2) (Same as Law 355)

For description of the course, see the *National Law Center* catalogue.

287 **Government Procurement Law** (2) (Same as Law 431)

For description of the course, see the *National Law Center* catalogue.

288 **Formation of Government Contracts** (2) (Same as Law 432)

For description of the course, see the *National Law Center* catalogue.

289 **Performance of Government Contracts** (2) (Same as Law 433)

For description of the course, see the *National Law Center* catalogue.

290 **Government Contract Claims and Litigation** (2) (Same as Law 434)

For description of the course, see the *National Law Center* catalogue.

291 **Seminar: Business Management** (3) Eastin

Primarily for doctoral students. Research on various phases of management as practiced in American industry. (Fall and spring)

293 **Business Research** (3)

Theory and practice in research methodology. Data sources and gathering, research models and designs, analysis and testing, controls, interpretation and presentation of findings. May be repeated once for credit. (Fall and spring)

295 **Business Decision Simulation** (3) Dickie

Managerial decision-making in a diversified firm in a simulated competitive environment in which a complex situation is played out using computers. Prerequisite: advanced Master's or doctoral degree standing.

297 **Case Studies in Business Administration** (3) Jessup, Page

Analysis of operational situations and policy issues. Developing and implementing solutions to managerial problems. Prerequisite: advanced Master's degree standing. (Fall and spring)

298 **Readings in Business** (3)

Supervised readings in selected fields within business administration. Admission by permission of instructor. May be repeated once for credit. (Fall and spring)

299 **Thesis Seminar** (3) Hartley

Examination of thesis standards, research philosophy and methodology. (Fall and spring)

300 **Thesis Research** (3) Staff

(Fall and spring)

FOURTH GROUP Staff

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Business Administration general examination. May be repeated for credit. (Fall and spring)

Staff

399 **Dissertion Research** (arr.)

Limited to Doctor of Business Administration candidates. May be repeated for credit. (Fall and spring)

Chemistry

Professors C.R. Naeser (*Chairman*), R.C. Vincent, R.E. Wood, T.P. Perros, W.E. Schmidt, D.G. White, J.B. Levy, Nicolae Filipescu

Associate Professors Bette Barton, F.L. Minn, A.D. Britt, E.A. Caress, D.A Rowley

Assistant Professorial Lecturer Donald Jerina

Bachelor of Arts or *Bachelor of Science with a major in Chemistry (Departmental)*—The Department offers two undergraduate majors designed to give students broad training in the basic divisions of chemistry: analytical, inorganic, organic, and physical chemistry. *Major I* provides considerable concentration in chemistry. However, it permits a wider selection of electives and thus should meet the needs of students preparing to enter medicine, dentistry, or related fields. *Major II* is intended primarily for students preparing for graduate study in chemistry or those planning to enter the chemical profession and wishing to be certified to the American Chemical Society as having met the minimum requirements for professional training. Two foreign languages are recommended for students planning to do graduate work in chemistry.

The following requirements must be fulfilled:

1. Students in either Major I or Major II must meet the general requirements as stated on pages 78, 83-88. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirements for "meaningful initiation" into the Humanities and Social Studies.

2. Prerequisite courses for Major I and Major II—Chem 11–12 and 22, or 15–16; Chem 51–52, 53–54; Math 30, 31; Phys 1, 2.

3. Required courses in other areas for Major I and Major II—12 semester hours, or equivalent, of introductory foreign language. (Students in Major I may elect French, German, Hebrew, Greek, Italian, Latin, Russian, or Spanish; students in Major II must elect German.)

4. (a) Required courses for Major I—B Sc 11–12 or Geol 1–2; Chem 111–12, 113–14, 122, 134, 141.

(b) Required courses for Major II—B Sc 11–12 or Geol 1–2; Chem 111–12, 113–14, 122, 141–42, 235; Math 32; one course selected from Chem 195, 207, 211, 221, 222, 234, 251, Math 111, 139, Phys 161, 165, 175, Stat 197.

For graduation with Special Honors in Chemistry, application must be made at the beginning of the senior year. Registration in Chem 195 is required at that time.

Master of Science in the field of Chemistry.—Prerequisite: a Bachelor's degree with a major in Chemistry from this University, or an equivalent degree.

Required: the general requirements, pages 93-100. The required 30 semester hours of graduate work must include Chem 213 and 221, and at least two of the following: Chem 207, 236, and 251. In addition to the above, Chem 193, 299–300, and at least 4 semester hours of advanced laboratory work are also required. Courses which may be taken to satisfy this laboratory requirement are Chem 221 and 22

semester hours), 136, 155, and 156; a maximum of 2 semester hours of Chem 5 may also be applied to the laboratory requirement. The thesis requirement, em 299–300, may be in analytical, inorganic, organic, or physical chemistry. em 156 is prerequisite to Master's thesis work in the field of organic chemistry. l graduate students are required to participate in the seminar program (Chem 1) and colloquium program. A reading knowledge examination in French, German, or Russian (German or Russian preferred) must be passed before the second lf of the work is started. A student who intends to become a doctoral candidate strongly urged to take Chem 207 as early as possible in his graduate program

Master of Science in the field of Geochemistry (an interdepartmental degree offered by the departments of Chemistry and Geology).—Prerequisite: a Bachelor's gree with a major in Chemistry or in Geology from this University, or an equivant degree.

Required: the general requirements, pages 93-100, including Chem 111, 112; Geol 41, 241, 249; Chem 213 or Geol 246; and Chem 299–300. The Master's Comprehensive Examination must be taken before registration for the second half of the esis work. A reading knowledge examination in a foreign language, approved by e Department of Chemistry or Geology, must be passed before beginning the esis work.

Doctor of Philosophy in the field of Chemistry.—Required: the general requirents, pages 93-97, 100-102. Course requirements depend on the student's background. he tool requirement options are (1) a foreign language reading examination in German and either French or Russian or (2) a foreign language reading examination in erman and a demonstrated proficiency in computer programming. The latter option is required for students in physical or theoretical chemistry. Cumulative examinations replace the "General Examination" requirement.

Research fields: Analytical Chemistry, Chemistry of Natural Products, Inorganic Chemistry, Organic Chemistry, Physical Chemistry (Electrochemistry, Kinetics, Magnetic Resonance, Theoretical), and Physical Organic Chemistry (Reaction Mechanisms).

Doctor of Philosophy field of study in Geochemistry (an interdepartmental field offered by the departments of Chemistry and Geology).—Required: the general requirements, pages 93-97, 100-102, including a reading knowledge examination in an approved foreign language plus the satisfactory completion of Stat 117 and 118, or 49, and the satisfactory completion of the General Examination in four fields, including chemistry and geochemistry.

Bachelor of Arts in Education with a teaching field in Chemistry.—Prerequisite: the Education curriculum, pages 80-81.

Required: the Chemistry option and professional courses on pages 111, 119.

Graduate Placement Examinations: All entering students in the Master's and Doctoral programs in the field of Chemistry are required to take the American Chemical Society Graduate Level Placement Examinations, given by the Department of Chemistry, prior to registration in the Graduate School of Arts and Sciences. The four placement examinations (in the disciplines of analytical, organic, inorganic, and physical chemistry) are of the multiple-choice type. These tests are designed to cover the subject matter in the disciplines generally taught in modern undergraduate programs preparatory for graduate work in chemistry, and the results are used by the Department to advise the individual student in planning a program of courses appropriate to his background.

Registration: Before completing registration each student must obtain from the representative of the Department an assignment to lecture, recitation, and laboratory sections. The work of the junior and senior years must be approved by the Department.

PHYSICAL SCIENCE

FIRST GROUP

3–4 Fundamentals of Physical Science (3–3) Barton, Filipescu, Mino

A year course for nonscience majors: credit toward a degree at this University given on completion of Chem 4. Lecture (2 hours), laboratory (3 hours). Selected topics from chemistry, physics, astronomy, and geology are integrated to introduce the nonscience major to the basic methods and achievements of physical science. Laboratory fee, $11 a semester. (Academic year)

CHEMISTRY

FIRST GROUP

Staff

11–12 General Chemistry (4–4)

A year course: credit toward a degree at this University given on completion of Chem 12. Lecture (3 hours), laboratory (3 hours), recitation (1 hour). Elementary course in general chemistry, including qualitative analysis. Prerequisite: one year of high school algebra. Laboratory fee, $18 a semester. (Chem 11 and 12—fall and spring)

Staff

13 General Chemistry (4)

For School of Engineering and Applied Science students only. Lecture (3 hours), laboratory (3 hours), recitation (1 hour). Atomic structure; chemical bonding; chemical equations; acids and bases; chemical equilibrium; liquid and solid states; periodicity; electrochemistry; organic chemistry. Prerequisite: Phys 2, Math 31. Laboratory fee, $18 (Fall)

Rowley

15–16 Intensive General and Analytical Chemistry (Honors Course) (4–4)

Chem 15: lecture (3 hours), laboratory (3 hours), recitation (1 hour). Chem 16: lecture (2 hours), laboratory (6 hours), recitation (1 hour). Equivalent to Chem 11–12 and 22, but with selected topics studied in depth. Prerequisite to Chem 15: high school physics and chemistry. Prerequisite to Chem 16: Chem 15. Admission by placement test prior to registration or on basis of College Board Advanced Placement Examination. Laboratory fee, $13 a semester. (Academic year)

Vincent

22 Introductory Quantitative Analysis (4)

Lecture (2 hours), laboratory (6 hours). Theory and practice of quantitative analysis by classical methods and introduction to instrumental analysis. Prerequisite: Chem 12. Laboratory fee, $18. (Fall and spring)

Caress

50 Introduction to Organic Chemistry (4)

Lecture (3 hours), laboratory (3 hours). A terminal course for students in related disciplines. This course does not fulfill the organic chemistry requirement for chemistry majors or premedical students. Prerequisite: Chem 12 or 16. Laboratory fee, $12. (Fall)

Levy, Caress

51–52 Organic Chemistry (3–3)

A year course: credit toward a degree at this University given on com-

pletion of Chem 52. Chemistry of the compounds of carbon. Prerequisite: Chem 12 or 16. (Academic year)

53–54 **Organic Chemistry Laboratory** (1–1) Staff

Laboratory complement of Chem 51–52. Prerequisite or concurrent registration: Chem 51–52. Prerequisite to Chem 54: Chem 53. Laboratory fee, $12 a semester. (Academic year)

OND GROUP

110 **Introduction to Physical Chemistry** (3) Wood

Topics include chemical thermodynamics, chemical kinetics, electrochemistry, solution chemistry, membrane and phase equilibria, and others. Prerequisite: Chem 16 or 22, Math 31, Phys 2; or permission of instructor. Not open to chemistry majors. May not be taken for credit by students who have received credit for Chem 111–12 or an equivalent course.

111–12 **Physical Chemistry** (3–3) Wood

Gas laws, chemical thermodynamics, solution chemistry, chemical equilibrium, kinetics, chemical statistics, electrochemistry, and other topics. Prerequisite to Chem 111: Chem 16 or 22; Math 31; Phys 2. Prerequisite to Chem 112: Chem 111. (Academic year)

113–14 **Physicochemical Measurements** (2–2) Wood, Schmidt

Laboratory complement to Chem 111–12 and 122. Prerequisite or concurrent registration for Chem 113: Chem 111. Prerequisite or concurrent registration for Chem 114: Chem 112, 113, and 122. Laboratory fee, $18 a semester. (Academic year)

122 **Instrumental Analysis Lectures** (2) Schmidt

Theory of instrumental methods in qualitative and quantitative analysis, determination of structure, and study of reaction mechanisms with emphasis on electroanalysis, spectrophotometry, and chromatography. Correlated with Chem 114. Prerequisite or concurrent registration: Chem 112. (Spring)

134 **Descriptive Inorganic Chemistry** (2) Rowley

Intermediate-level course emphasizing the descriptive chemistry of the elements. Prerequisite: Chem 16 or 22, 52. Prerequisite or concurrent registration: Chem 111. (Fall)

136 **Inorganic Chemistry: Preparations** (2) Perros

Application of the technique of inorganic chemistry to the preparation and purification of a list of selected substances. Prerequisite: Chem 52 and 141. Prerequisite or concurrent registration: Chem 134 or 235. Laboratory fee, $18. (Spring)

141–42 **Advanced Experimental Chemistry** (2–2) White, Caress

Designed to provide the chemistry major with facility in experimental methods common to all disciplines of chemistry. Prerequisite: Chem 54. Prerequisite or concurrent registration: Chem 111. Laboratory fee, $12 a semester. (Academic year)

155 **Organic Chemistry: Preparations** (2 or 3)

Synthesis of organic compounds and application of the technique of organic chemistry to the preparation of pure compounds, using larger

amounts and greater refinements than in Chem 53–54. Prerequisite: Chem 16 or 22, 54. Laboratory fee, $10.50 a semester hour. (Spring)

156 **Qualitative Organic Analysis** (3)

Lecture (1 hour), laboratory (6 hours). Identification of pure organic compounds, separation of mixtures, and identification of their components. Required of all students planning thesis work in organic chemistry. Prerequisite: Chem 16 or 22, 54. Laboratory fee, $18. (Spring)

Perros

191 **History of Chemistry** (2)

Historical development of chemistry. Prerequisite: Chem 52. (1973–74 and alternate years—fall)

Staff

195 **Undergraduate Research** (1 or 2)

Research on problems approved by the Staff. May be repeated once for credit. Laboratory fee, $7.50 a semester hour. (Fall and spring)

THIRD GROUP

Levy

203 **Chemical Kinetics** (2)

Rates of chemical reactions and factors influencing them. Prerequisite: Chem 52, 112. (1973–74 and alternate years—spring)

Bartell

207 **Chemical Bonding** (3)

Application of wave mechanics to current chemical problems. Molecular orbital theory, atomic and molecular structure, spectroscopy, chemical application of group theory. Prerequisite: Chem 112. (Fall)

Wood

211–12 **Physical Chemistry** (2–1)

Same as Chem 111–12. Admission only by departmental permission. Credit assigned upon satisfactory completion of Chem 213. (Academic year)

Wood

213 **Chemical Thermodynamics** (3)

Application of thermodynamics to chemical problems. Thermochemistry, homogeneous and heterogeneous equilibria, statistical calculation of thermodynamic properties, electrochemistry. Prerequisite: Chem 112 or 212. (Fall)

Barton

214 **Principles of Magnetic Resonance** (3)

Application of magnetic resonance to chemical problems, emphasis on the close connection between theory and experiment. Molecular motions, relaxation theory, bonding, etc. Prerequisite: Chem 207 or permission of instructor. (1972–73 and alternate years—spring)

Mint

215 **Quantum Chemistry** (3)

Postulates of quantum mechanics, exactly solvable systems, variation and perturbation approximations, atomic and molecular structure and spectra, the chemical bond. Prerequisite: Chem 207 or permission of instructor. (1973–74 and alternate years—fall)

Barton

216 **Statistical Mechanics as Applied to Chemistry** (3)

Introduction to classical and quantum statistics designed to acquaint the student with basic principles and application of method. Prerequisite or concurrent registration: Chem 207 or permission of instructor (1973–74 and alternate years—spring)

219 **Spectrochemistry** (3) Filipescu

Energetic states of molecules under the influence of electromagnetic radiation and their relation to structures and spectroscopic properties. Prerequisite: Chem 207 and 221, or permission of instructor. (1973–74 and alternate years—spring)

221 **Advanced Analytical Chemistry I** (3) Britt

Lecture (2 hours), laboratory (3 hours). Theory and application of recent spectrometric methods of analysis, including electrical, magnetic, and optical instrumentation. Prerequisite: Chem 122. (Spring)

222 **Advanced Analytical Chemistry II** (2 or 3) Schmidt

Lecture (2 hours), laboratory (3 hours—optional). Theory and application of electroanalysis and separations by physicochemical methods. Prerequisite: Chem 122. Laboratory fee, $7.50. (1973–74 and alternate years—fall)

231 **Coordination Chemistry** (2) Perros

Application of ligand field theory and molecular orbital theory to transition metal complexes, determination of stability constants, and methods for the synthesis of representative coordination compounds. Prerequisite: Chem 237. (1972–73 and alternate years—fall)

232 **The Lanthanide and Actinide Elements** (2) Perros

Comprehensive review of the physical and chemical properties of the lanthanide and actinide elements; particular emphasis on the more recent developments. Prerequisite: Chem 236. (1972–73 and alternate years—spring)

233 **Organometallic Chemistry** (3) White

Survey of organometallic compounds with emphasis on the compounds of lithium, boron, aluminum, silicon, the transition metals, and the catalytic role of certain organotransition metal complexes. Prerequisite: Chem 236 and 251, or permission of instructor. (1972–73 and alternate years—fall)

235–36 **Advanced Inorganic Chemistry** (3–3) White

Application of modern chemical theories to inorganic substances and reactions followed by a detailed study, developed from the periodic table, of the chemistry of the more common elements. Prerequisite to Chem 235: Chem 52, 112. Prerequisite to Chem 236: Chem 235. (Academic year)

237 **Physical Inorganic Chemistry** (2) Rowley

Quantitative application of modern theories for interpretation and explanation of the electronic properties of transition-metal complexes. Prerequisite: Chem 112 and 134, or Chem 235. (1973–74 and alternate years—spring)

251–52 **Advanced Organic Chemistry** (3–3) Filipescu

Synthesis, reactions, and properties of organic compounds; fundamental theories of organic chemistry, emphasis on reaction mechanisms. Prerequisite to Chem 251: Chem 52, 112. Prerequisite to Chem 252: Chem 251. (Academic year)

257 **Physical Organic Chemistry** (2) Levy
Physical aspects of the reactions of organic compounds; effects of structure and medium on reactivity. Prerequisite: Chem 252 or permission of instructor. (1972–73 and alternate years—spring)

258 **Natural Products** (2) Caren
Methods of structure determination and synthesis of naturally occurring compounds; some aspects of the chemistry of terpenes, steroids, alkaloids, etc. Prerequisite: Chem 251 or permission of instructor. (1972–7 and alternate years—spring)

259 **Polymer Chemistry** (3)
Preparation, properties, and structure of macromolecules. Prerequisite Chem 52, 112. (1973–74 and alternate years—fall)

291 **Seminar: Recent Developments in Chemistry** (0) Staff
All graduate students are required to participate in this seminar through out their period of residence in the Department. No academic credit. No tuition fee required. (Fall and spring)

295 **Research** (arr.) Staff
Research on problems approved by the staff. Open to qualified students with advanced training. May be repeated for credit not to exceed a total of 8 semester hours. Laboratory fee, $7.50 a semester hour. (Fall and spring) Staff

299–300 **Thesis Research** (3–3)
Laboratory fee, $18 a semester. (Fall and spring)

FOURTH GROUP Staff

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy cumulative examinations. May be repeated for credit. (Fall and spring) Staff

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit (Fall and spring)

Chinese

See "East Asian Languages and Literatures."

Classics

Professor J.F. Latimer
Associate Professorial Lecturers A.B. Seidman, Sylvia Gerber
Assistant Professor J.E. Ziolkowski (*Chairman*)
Assistant Professorial Lecturers Mary Norton, Mary Nutting, D.B. Beers, Z Porath

Bachelor of Arts with a major in Classical Humanities (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88.
2. Prerequisite courses—Clas 1–2, 3–4; or equivalent; or Clas 11–12, 13–14; and Clas 71–72.
3. Required courses in the major—Clas 108, 113, 127, 138; Art 101 or 102, 111; Hist 109, 110; and either Hist 105 or Phil 111.

Bachelor of Arts with a major in Latin (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88.
2. Prerequisite courses—Clas 1–2, 3–4; or equivalent.
3. Required courses in related areas—Art 111; Hist 109, 110; and either Hist 105 or Phil 111. (A reading knowledge of French and German is recommended.)
4. Required courses in the major—22 semester hours in second-group Latin courses, including Clas 131–32, 138.

Bachelor of Arts with a major in Classical Archeology and Greek (Departmental).—An interdepartmental major arranged in conjunction with the Department of Art. The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Natural and Mathematical Sciences.)
2. Prerequisite courses—Clas 11–12, 13–14.
3. Required courses in the major—Art 101, 102, 103, 111; Hist 109, 110; 14 semester hours in second-group courses in Greek, including Clas 138. (A reading knowledge of French and German is recommended.)

Master of Arts in the field of Classical Archeology, Classics, and History (an interdepartmental degree program offered by the departments of Art, Classics, and History).—Prerequisite: A Bachelor's degree with a background in Classical Archeology and either Greek or Latin. Applicants from other institutions must present scores on the Graduate Record Examination to the Office of the Graduate School of Arts and Sciences.

Required: the general requirements, pages 93–100. The program of study consists of 24 semester hours of course work (as many as possible should be third-group courses) selected in consultation with the appropriate adviser from the departments of Art, Classics, and History; plus a thesis (equivalent to 6 additional semester hours). Candidates must pass a reading knowledge examination in French or German. All candidates are required to pass a general Master's Comprehensive Examination.

LATIN AND GREEK

FIRST GROUP

1–2 First-year Latin (3–3) — **Nutting and Staff**

A year course: credit toward a degree at this University given on completion of Clas 2. Grammatical essentials of the language, appropriate reading selections, development of English derivatives, introduction to Roman life and literature. (Academic year)

3–4 Second-Year Latin (3–3) — **Gerber**

A year course: credit toward a degree at this University given on completion of Clas 4. Emphasis on Latin readings that illustrate Roman life and literature. Prerequisite: Clas 1–2 or two years of high school Latin. (Academic year)

Ziolkowski

11–12 **First-year Greek** (3–3)

A year course: credit toward a degree at this University given on completion of Clas 12. Introduction to Homeric Greek: emphasis on grammar and vocabulary to prepare the student to read Greek epic poetry. (Academic year)

Latimer

13–14 **Second-year Greek** (3–3)

A year course: credit toward a degree at this University given on completion of Clas 14. Review of grammar; readings from Homer, Herodotus, and Plato. Prerequisite: Clas 12. (Academic year)

SECOND GROUP

Staff

101–2 **Latin Prose and Poetry** (3–3)

(Formerly Introduction to Latin Literature)

Selections from a wide variety of Latin authors of prose and poetry. Prerequisite: Clas 3–4 or equivalent.

Norton

109–10 **Major Latin Authors** (3–3)

(Formerly Latin Prose and Poetry of the Golden Age)

Selections from one or two major authors will be read each semester. May be repeated for credit. Prerequisite: Clas 101–2 or permission of instructor. (Academic year)

Staff

117 **Latin Prose and Poetry of the Silver Age** (3)

Survey of major authors of the Silver Age. May be repeated for credit.

Norton

131–32 **Latin Prose Composition** (1–1)

Exercises in Latin prose composition for Latin majors. Other students may enroll by permission of instructor.

Andrews

134 **Medieval Latin** (3)

(Formerly Clas 141)

Selections from the Vulgate and representative Latin writers through the 11th century. Prerequisite: Clas 101–2 or permission of instructor. May be taken for graduate credit with approval of instructor.

Staff

135–36 **Survey of Latin Literature** (3–3)

Latin literature in historical sequence. For Latin majors. Other students may enroll by permission of instructor.

Ziolkowski

139–40 **Major Greek Authors** (3–3)

(Formerly Clas 139 Readings in Greek Literature (1 or 2))

Selections from a wide variety of Greek prose, drama, and poetry, suited to the needs of the class. May be repeated for credit with permission of instructor. Prerequisite: Clas 14. (Academic year)

COURSES IN ENGLISH TRANSLATION

FIRST GROUP

Staff

64 **Greek and Latin Origins of English Words** (3)

Study of Greek and Latin roots in English to improve vocabulary and facilitate understanding of the language of science, philosophy, politics, etc.

71 **Greek and Roman Epic, History, and Biography** (3) Ziolkowski

Selections from Homer, Herodotus, Thucydides, Plutarch, Livy, Tacitus, Suetonius, Vergil, and Ovid. Students who receive credit for Clas 105 cannot receive credit for Clas 71. (Fall)

72 **Greek and Roman Poetry, Philosophy, and Satire** (3) Ziolkowski

Survey of major lyric and dramatic poets (including Sophocles, Euripides, and Aristophanes); philosophers (Plato, Aristotle); and satirists (Juvenal, Petronius, Apuleius). Students who receive credit for Clas 105 cannot receive credit for Clas 72. (Spring)

SECOND GROUP

105 **Survey of Classical Humanities** (3) Norton

Representative masterpieces of Greek and Roman literature: epic, lyric, dramatic, philosophical, and historical. Students who receive credit for Clas 71 or 72 cannot receive credit for Clas 105.

108 **Classical Mythology** (3) Norton

Mythology of the Greeks and Romans from the creation of the world: tales of the gods, heroes, and great families that have influenced literature, art, and music. (Spring)

113 **Greek and Roman Drama** (3) Norton

Selected masterpieces of Greek and Roman tragedy and comedy. (Fall)

127 **Classical Influence on Western Civilization** (3) Ziolkowski

(Formerly Legacy of Greece and Rome)

A survey of Greek and Roman influence on Western civilization relevant to modern America: literature, art, law, science, philosophy, etc. Prerequisite: At least one 3-semester-hour survey course in Greek and Roman literature.

138 **Introduction to Classical Studies** (2) Beers

Survey of the broad range of sources and resources involved in pursuing classical studies: standard references, periodicals, library holdings, papyrology, textual criticism, history of classical scholarship. (Spring)

171 **Seminar: Classics and Goals for America** (3) Latimer

An extensive and intensive search for ways of applying ancient thought to modern problems. Selected current readings; extensive reading of Greek and Latin authors. Admission by permission of instructor. (Fall)

HEBREW

FIRST GROUP

21–22 **First-year Hebrew** (3–3) Seidman

A year course: credit toward a degree at this University given on completion of Clas 22. Study of the elements of Hebrew; emphasis on sources of the language, reading comprehension, writing facility, and conversation. (Academic year)

23–24 **Second-year Hebrew** (3–3) Seidman

A year course: credit toward a degree at this University given on completion of Clas 24. Review of grammar; continued development of reading comprehension, writing facility, and conversation. Selections from Hebrew text of the Old Testament and other materials. (Academic year)

Drama

See "Speech and Drama."

East Asian Languages and Literatures

Professor Chung-wen Shih (*Acting Chairman*)
Associate Professorial Lecturers Jane Evans, Thomas Lawton
Assistant Professors G.C.Y. Wang, D.L. Lee, P.L. Sargent (*Visiting*)

Bachelor of Arts with a major in Chinese Language and Literature.—This degree program is offered in the School of Public and International Affairs and in Columbian College of Arts and Sciences. Students must fulfill the requirements as described in either I or II below.

I. *School of Public and International Affairs*

(a) Prerequisite: a minimum of 60 semester hours in Columbian College, see page 82; or the equivalent from another accredited institution, is required.

(b) The general requirements stated on pages 164–66.

(c) Required for the major—Asia 11–12, 103, 105, 165, 167, and 36 semester hours of second-group Chinese literature courses. The student is required to pass a major examination at the end of the senior year. The coordinated field of knowledge upon which the student will be examined includes an active command of modern Chinese language and a general knowledge of Chinese literature and culture. A proseminar (199–200) assists the student in preparation for the major examination.

II. *Columbian College of Arts and Sciences*

(a) The general requirements stated on pages 78, 83–88, including Asia 1-2, 3–4, and 9; or Asia 5–6 (preferred).

(b) A program of study in preparation for the major examination at the end of the senior year (this is the same requirement as described under I. (c). above).

In Columbian College of Arts and Sciences, Chinese Language and Literature is a Field-of-Study major.

Bachelor of Arts in the field of Chinese Studies.—See Public and International Affairs, page 388.

CHINESE

FIRST GROUP

*1–2 **Beginning Mandarin Chinese, Level I** (3–3) Staff

A year course: credit toward a degree at this University given on completion of Asia 2. Classroom (3 hours), laboratory (1 hour). Fundamentals of grammar and pronunciation with graded reading and practice in writing. Laboratory fee, $17.50 a semester. (Academic year)

* The combination of Asia 1-2, 3-4, and 9 is equivalent to Asia 5-6.

*3–4 **Beginning Mandarin Chinese, Level II** (3–3) Wang

A year course: credit toward a degree at this University given on completion of Asia 4. Classroom (3 hours), laboratory (1 hour). Continuation of grammar and spoken Chinese with more emphasis on the written language and reading. Prerequisite: Asia 2 or equivalent. Laboratory fee, $17.50 a semester. (Academic year)

5–6 **Beginning Intensive Mandarin Chinese, Levels I-II** (8–8) Lee

Intensive beginners' course in fundamentals of grammar and pronunciation with graded reading and practice in writing. Prerequisite to Asia 6: Asia 5. Laboratory fee, $17.50 a semester. (Academic year)

*9 **Beginning Mandarin Chinese, Level II** (4)

Reading of simple modern expository writings. Analysis of syntactic structure and practice in writing. Prerequisite: Asia 4. (Fall or spring)

11–12 **Intermediate Intensive Mandarin Chinese** (6–6) Wang

(Formerly Asia 7–8)

Reading basic texts; writing short pieces; conversation; systematic review of grammar. Prerequisite to Asia 11: Asia 6 or 9. Prerequisite to Asia 12: Asia 11. Laboratory fee, $17.50 a semester. (Academic year)

SECOND GROUP

103 **Intensive Readings in Modern Chinese** (6) Sargent

Intensive readings in selected modern literary works, social sciences, and documentary materials. Prerequisite: Asia 12 or equivalent. (Fall)

105 **Introduction to Classical Chinese (Intensive)** (6) Staff

Introduction to classical writing in Chinese literature, history, and philosophy. Prerequisite: Asia 4 or 6. (Spring)

123–24 **Introduction to Chinese Linguistics** (3–3) Staff

Introduction to the history of the Chinese language. Analysis of linguistic structure of modern spoken Chinese and classical Chinese. Prerequisite: Asia 4 or 6, or a course in linguistics.

161 **Aspects of Chinese Culture** (3) Lawton

Lecture on and discussion of the emergence and stylistic development of neolithic painted pottery, Shang and Chou dynasty bronze ritual vessels, Buddhist art, and figure and landscape painting. (Spring)

171–72 **Poetry of the T'ang and Sung Periods** (3–3) Staff

Reading of works of leading poets. Discussion of content and style. Prerequisite: Asia 103 or equivalent.

173 **Yüan Drama** (3) Shih

Readings of plays by Kuan Han-ch'ing, Ma Chih-Yüan, Cheng Kuang-chu, Po P'u, and Wang Shih-fu. Prerequisite: Asia 103 or equivalent.

177–78 **Prose Narratives of the Sung, Ming, and Ch'ing Periods** (3–3) Staff

Short stories of the Sung period. Selected readings of Ming-Ch'ing novels.

*The combination of Asia 1-2, 3-4, and 9 is equivalent to Asia 5-6.

Historical development and stylish traits. Prerequisite: Asia 103 or equivalent. Staff

179–80 **20th Century Chinese Literature** (3–3)
Short stories of Lu Hsün, Lao She, and others. Informal essays by Lu Hsün, Chou Tso-jen, and Chu Tzu-ch'ing. Drama of T'ien Han and Ts'ao Yü. Prerequisite: Asia 103 or equivalent. Staff

185–86 **Directed Reading** (3–3)
Reading of material pertaining to individual research. Admission by permission of instructor. (Academic year) Staff

199–200 **Proseminar: Readings for the Major in Chinese Language and Literature** (3–3)
Conferences and group discussions. (Academic year)

EAST ASIAN LITERATURE IN TRANSLATION

FIRST GROUP

91–92 **Introduction to Asian Literature** (3–3) Evans, Shih
Survey of Chinese, Japanese, and Indian literature, in translation, from earliest periods through literary masterpieces of the early 20th century. Lecture and discussion—in English. Term paper required.

SECOND GROUP

165 **Chinese Literature in Translation** (3) Evans
Open to students who have no knowledge of the Chinese language. General survey of the development of Chinese literature from ancient times to present. (Fall) Shih

167 **Chinese Fiction in Translation** (3)
Open to students who have no knowledge of the Chinese language. Reading of major novels, including *All Men Are Brothers*, *Golden Lotus*, *Dream of the Red Chamber*, and *The Travels of Lao Ts'an*. (Spring)

JAPANESE

FIRST GROUP Staff

21–22 **Beginning Intensive Japanese** (8–8)
Intensive beginners' course in fundamentals of grammar and pronunciation with graded reading and practice in writing. Prerequisite to Asia 22: Asia 21. Laboratory fee, $17.50 a semester. (Academic year)

Economics

Professors A.E. Burns, J.W. Kendrick, C.T. Stewart, Jr., C.E. Galbreath, Joseph Aschheim, R.P. Sharkey, Henry Solomon (*Chairman*), Sar Levitan, Louis Dl Alessi, Robert Davis (*Research*), Theodore Suranyi-Unger, Jr. (*Research*), Ching-Yao Hsieh

djunct Professors T.F. Carroll, Barend de Vries, H.P. Miller
rofessorial Lecturer John Hardt
ssociate Professors Mary Holman, R.Y.C. Yin, W.F.E. Long, S.E. Haber, R.M. Dunn, Jr., G.C. Eads
ssociate Professorial Lecturers H.H. Hinrichs, William Poole
ssistant Professors J.T. Bennett, J.E. Fredland, J.R. Barth, A.M. Yezer
djunct Assistant Professor Henry Peskin
ssistant Professorial Lecturers P.B. Ginsburg, J.C. Miller III

Bachelor of Arts with a major in Economics (Departmental).—The following equirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should onsult the departmental adviser regarding courses to be taken in satisfying the equirement for "meaningful initiation" into the Humanities and the Natural and Mathematical Sciences.)
2. Prerequisite course—Econ 1–2.
3. Required courses in related areas—Math 31 and 32; Stat 111 and 112, or quivalent; 6 semester hours of a Social Study other than Economics.
4. Required courses in the major—Econ 101, 102, 121, 198, and 15 additional emester hours of second-group Economics courses to be approved by the depart mental adviser.

Master of Arts in the field of Economics.—Prerequisite: a Bachelor of Arts de ree with a major in Economics from this University, or an equivalent degree. Required: the general requirements, pages 93–100, including (1) Econ 203–4, 205; 2) 15 additional semester hours to be selected from other third-group Economics ourses; (3) a Master's Comprehensive Examination in economic theory; (4) com letion of a tool requirement (either the passing of a reading knowledge examina ion in one foreign language or the satisfactory completion of one of the following ourses: Math 34, Stat 157–58, or Stat 197); and (5) a thesis (Econ 299–300).

Doctor of Philosophy in the field of Economics.—Required: the general require ents, pages 93–97, 100–102, including (1) Econ 201–2, 203–4, 205, 215–16, 379– 80, and 21 additional semester hours of approved graduate course work in the stu y areas of study; (2) passing of the General Examination in five areas (Micro economic Theory, Macroeconomic Theory, the History of Economic Thought, and two other fields selected by the student and the doctoral program committee); (3) completion of the tool requirement (the passing of a reading knowledge examination in one foreign language plus the satisfactory completion of Math 34, Stat 157–58, Stat 197, and (4) a dissertation to demonstrate the candidate's ability to do original research in one of the following fields: Econometrics, Economic Develop ment, Economic History, Economic Policy, Economic Theory, Environmental Eco nomics, History of Economic Thought, Industrial Organization, International Eco nomics, Labor Economics, Mathematical Economics, Monetary Economics, National Income Accounting, Natural Resources Economics, Public Finance, Regional and Urban Economics, and Soviet Economics.

Departmental prerequisite: Econ 1–2 is prerequisite to all other courses in Eco nomics.

FIRST GROUP

1–2 **Principles of Economics (3–3)** **Staff**

Lecture (2 hours), recitation (1 hour). Survey of the major economic principles, institutions, and problems in contemporary life. Econ 1 is prerequisite to Econ 2. **(Econ 1 and 2—fall and spring)**

SECOND GROUP

101 Intermediate Microeconomic Theory (3) Yin
Analysis of supply, demand, and pricing. (Fall and spring)

102 Intermediate Macroeconomic Theory (3) Holman, Yin
Theories of national income determination and growth. (Fall and spring)

104 History of Economic Thought (3) Haich
History of the major schools of economic thought, influence of changing problems on the development of economic theory. (Spring)

105 Economics Condition Analysis and Forecasting (3) Kendrick
Theory and empirical analyses of economic trends and fluctuations, use of economic indicators and simple econometric models, workshop experience in an analysis of an aspect of the U.S. economy. (Fall)

121 Money and Banking (3) Staff
Nature of money, credit, commercial banking, and other financial institutions in the U.S. monetary system. (Fall and spring)

122 Monetary Theory and Policy (3) Staff
Analysis of role of money in economic activity in terms of supply of and demand for loanable funds, interest rates and price level. Problems of U.S. monetary policy. Prerequisite: Econ 121. (Spring)

***123 Introduction to Econometrics** (3) Bennett
Construction and testing of economic models: regression theory, parameter estimation, and statistical techniques applicable to economic models. Prerequisite: Econ 101, 102; Math 31; Stat 111. (Fall or spring)

133 Economy of the Soviet Union (3) Hard
Development and main features of economic life in the Soviet Union. (Fall)

134 Comparative Communist Economic Systems (3) Hard
Analysis of economic development and performance of the Soviet Union and other Soviet-type economies. Institutional aspects and quantitative measures of performance. (Spring)

136 Natural Resources and Environmental Economics (3) Holman
(Formerly Natural Resources Economics)
Analysis of economic problems of natural resources development and utilization and environmental quality. Prerequisite: Econ 101. (Spring)

142 Labor Economics (3) Haber
Characteristics of American labor force, operations of labor market, wage theories and practices, impact of collective bargaining, causes and characteristics of unemployment, public policies and programs. (Fall)

* Interdepartmental course offered by the departments of Economics and Statistics.

*147 **Economic History of Europe** (3) Sharkey

European economic development since the Middle Ages; emphasis on the period following the Industrial Revolution. Evolution of capitalism and its impact upon the societies of Europe.

157 **Regional and Urban Economics** (3) Stewart

Analysis of the processes of interregional interaction, the urban hierarchy, urban structure, and policies for regional and urban development. (Spring)

158 **Industrial Organization** (3) Long

Analysis of the structures and production, pricing, and related practices of industries with emphasis on their significance and on appropriate economic policies. (Spring)

161 **Public Finance I** (3) Fredland

Theoretical and institutional analysis of government expenditures, taxation, and intergovernmental fiscal relations. (Fall)

162 **Public Finance II** (3) Fredland

Theoretical and institutional analysis of fiscal policy and debt management. (Spring)

165 **Economic Policy** (3) Stewart

Application of economic analysis to selected contemporary economic problems. (Fall)

169 **Introduction to the Economy of Communist China** (3) Yin

Background, organization, and operation of the economy. Appraisal of performance and analysis of problems of development. (Fall)

170 **Introduction to the Economy of Japan** (3) Staff

Analysis of the structure and growth of the Japanese economy. (Spring)

*179–80 **U.S. Economic History** (3–3) Sharkey

Process of economic growth from Colonial times to the present. Development of various sectors in the economy and their interdependence. Econ 179: 1607–1865. Econ 180: 1865 to present. (Academic year)

181–82 **International Economics** (3–3) Galbreath, Dunn

Econ 181: international trade theory and international monetary theory. Econ 182: continuation of international monetary theory; economic development. (Academic year)

185–86 **Economic History and Problems of Latin America** (3–3) Hinrichs

Analysis of present structures and problems of Latin American economies. (Academic year)

198 **Proseminar in Economics** (3) Holman, Long

Examination of major topics in economic theory and the application of theory and analysis to policy problems. Open only to economics majors in their senior year. (Fall and spring)

* Interdepartmental course offered by the departments of Economics and History.

199 **Independent Research in Economics** (3) Staff
Under the personal direction of an instructor. Limited to economics majors with demonstrated capacity. Prior approval of instructor required. (Fall and spring)

THIRD GROUP

Third-group Economics courses (except 217–18) are designed for graduate students in Economics or for graduate students with prescribed prerequisites.

201–2 **History of Economic Thought** (3–3) Burns, Haig
Critical analysis and interpretation of the development of economic theory from Aristotle through the 19th century. (Academic year)

203–4 **Microeconomic Theory** (3–3) De Alessi
Econ 203: theories of the consumer and of the firm. Econ 204: theories of markets. (Econ 203 and 204—fall and spring)

205 **Macroeconomic Theory** (3) Hsieh, Peake
Classical, Keynesian, and modern theories of income determination and employment. (Fall and spring)

207 **Business Cycle Analysis** (3) Kendrick
Empirical analysis of American business cycles; evaluation of the methodology and findings of the National Bureau of Economic Research. Statistical tests of theories of the business cycle. (Spring)

208 **National Income** (3) Kendrick
Theory and measurement of economic aggregates within an integrated national income accounts framework, including balance sheets and wealth statements. (Spring)

210 **Economic Methodology** (3) Stewart
Methodology of economics, review of selected theoretical issues in economic theory. Prerequisite: 6 semester hours of graduate courses in economic theory. (Spring)

215–16 **Mathematical Economics** (3–3) Solomon
Formulation and application of mathematical models in economic theory. Prerequisite: a one-year calculus sequence. (Academic year)

217–18 **Survey of Economics** (3–3) Heller
For graduate students in fields other than economics. Econ 217: price theory. Econ 218: income and employment theory. Departmental prerequisite waived. (Econ 217 and 218—fall and spring)

223–24 **Monetary Theory and Policy** (3–3) Aschheim
Theory of monetary policy within the framework of contemporary American central banking. (Academic year)

233 **Seminar: Agrarian Reform and Development in Latin America** (3) Castillo
Analysis of Agrarian reform movements and programs in the context of current development issues in Latin American countries. (Fall)

234 **Seminar: Evaluation of Rural Development Projects in Latin America** (3) — Carroll

Review of criteria for the design and evaluation of rural investment projects; case studies drawn from the experience of development agencies. (Spring)

237 **Seminar: Economics of the Environment and Natural Resources** (3) — Holman

(*Formerly Seminar: Economics of Natural Resources Policy*)

Analysis of public policy problems relating to the environment and natural resources development and management. (Fall)

241–42 **Labor Economics** (3–3) — Haber

Analysis of labor markets, theories of wages, impact of collective bargaining, causes of unemployment, public policies and programs. (Academic year)

243 **Seminar: Manpower Policy** (3) — Levitan, Mangum

Developments leading to expansion of public investment in manpower resources; evaluation of goals and operations of publicly supported programs. (Fall)

251–52 **Economic Development** (3–3) — de Vries

Theories and problems of economic growth; special attention to the underdeveloped countries. (Academic year)

253 **Productivity Analysis** (3) — Kendrick

Concepts, measurement, and analysis of productivity in business and government at aggregate and organizational levels. (Fall)

257 **Regional and Urban Economics** (3) — Stewart

Theory of location of economic activities, analysis of interregional equilibrium and dynamics of regional growth, structure and processes of urban development. (Spring)

259 **Income Distribution** (3) — Miller

Theoretical and empirical analysis of income distribution, including analysis of policies related to income inequality. Open to advanced undergraduate Economics majors. (Fall)

261 **Welfare Economics** (3) — Stewart

Theories of welfare economics and their applications to public policy; analysis of selected topics in public policy. (Fall)

263 **Theory of Public Finance I** (3) — Fredland

Allocation and distribution aspects of government budget policy including critical analysis of theories and principles of expenditures, taxation, and intergovernmental fiscal relations. (Fall)

264 **Theory of Public Finance II** (3) — Fredland

Stabilization aspects of government budget policy: analysis of effects of fiscal policy and debt management on level of employment, prices, and rate of economic growth. (Spring)

265–66 **Industrial Organization** (3–3)
(This course replaces former Econ 265 Economics of Regulatory Policy and Econ 266 Antitrust Policy)
Structure and performance of the American economy; emphasis on the economics of antitrust policy and the impact of government regulatory practices. (Academic year)

267 **Seminar: Soviet Economy** (3)
Development of the Soviet-type economy. Organization, policies, and problems: monetary, production, allocative, foreign trade, economic growth. Admission by permission of instructor. (Fall)

268 **Seminar: Economic Theory and Development in Communist Countries** (3)
Appraisal of the Soviet model for economic development in the communist world, especially in Eastern Europe and China. Admission by permission of instructor. (Spring)

269 **Economy of Communist China I** (3)
Analysis of organization, operation, policies, and problems. Development of the economy under communism. (Fall)

270 **Economy of Communist China II** (3)
Continuation of Econ 269, examining critical problems of development. Prerequisite: Econ 269 or permission of instructor. (Spring)

271 **Economy of Japan** (3)
Analysis of Japanese economic institutions and their contribution to Japan's development. (Fall)

*275 **Econometrics I: Introduction** (3)
Single equation models of economic behavior. Statistical methods for testing economic hypotheses and estimating parameters. Introduction to simultaneous equations problems. Prerequisite: Stat 157–58 or equivalent or permission of instructor. (Fall)

*276 **Econometrics II: Simultaneous Equation Models** (3)
Economic models and simultaneous equations systems. Prerequisite: Econ 275. Recommended: a course in matrix theory. (Spring)

281–82 **International Economics** (3–3)
Econ 281: theory of international trade and factor movements. Econ 282: theory of balance-of-payments adjustment. (Academic year)

285–86 **Economic Development of Latin America** (3–3)
Current policies and programs, capital formation, public and private foreign loans and investment; social and technological preconditions of investment.

287 **Seminar: Problems in Latin American Civilization** (3)
Interdisciplinary seminar partially guided by a specialist within the methodology of his chosen discipline; each student writes a report on some aspect of a selected key theme. Admission by permission of instructor. (Spring)

* An interdepartmental course offered by the departments of Economics and Statistics.

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

Fourth-group Economics courses are limited to graduate students and are primarily for doctoral candidates. They are offered as the demand requires.

312 **Seminar: Price Theory** (3) De Alessi
Discussion of topics of price theory from recent journal articles.

313 **Seminar: Economic Thought in the 20th Century** (3) Burns
Continuation of Econ 201–2. Principal trends in English, Continental, and American economic thought during the present century.

315 **Seminar: Topics in Mathematical Economics** (3) Solomon
Intensive study of selected topics including economic activity analysis, risk and uncertainty, and other topics of current interest. Prerequisite: Econ 215–16.

321 **Seminar: Monetary Theory** (3) Aschheim
Recent developments in monetary theory.

341 **Seminar: Labor Economics** (3) Staff
Current problems in theory and policy.

363 **Seminar: Public Finance** (3) Staff
Selected topics of current interest.

*378 **Seminar: Topics in Econometrics** (3) Staff
A research seminar covering current econometric literature and special topics. Admission by permission of instructor.

†379–80 **Readings in Economic History** (3–3) Sharkey
Prerequisite: the appropriate second-group preparation and consent of instructor. (Academic year)

390 **Seminar: International Economic Theory** (3) Staff
Examination of recent contributions in this field.

391 **Seminar: International Economic Policy** (3) Staff
Topics selected from current significant policy problems.

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

*An interdepartmental course offered by the departments of Economics and Statistics.
†An interdepartmental course offered by the departments of Economics and History.

Education

Professors G.L. Angel, W.T. Carroll, Carol St. Cyr, Mary Ellen Coleman, H.G. Detwiler (*Chairman*), Daniel Sinick, R.E. Baker, Martha Rashid, Rodney Tillman, Anthony Marinaccio, L.H. Elliott, Leonard Nadler, Marcella Brenner

Professorial Lecturers J.B. Holden, W.W. Chase, D.D. Darland, Allan Drexler, N.P. Atkins, Norman Drachler

Associate Professors J.G. Boswell, Margaret McIntyre, C.E. Vontress, R.J. Frankie, Dorothy Moore, Lawrence Winkler

Associate Professorial Lecturers LuVerne Walker, Beverly Heinle, Martha Ware, P.E. Arsenault, K.W. Rollins, David Iwamoto, W.W. Burke, A.C. Jensen, Samuel Kavruck, John Woodburn

Assistant Professors Gloria Horrworth, Donald Linkowski, Ruth Peterson, G.D Wiggs, S.R. Paratore, G.W. Smith

Assistant Professorial Lecturers R.J. Kubalak, Shirley McCune, J.D. Gates, Marjorie Daly, Marianne Phelps, Carla Heymsfeld, V.E. Greaver, R.E McNelis, Norma Eitington, Margery West, Agnes Lawless, H.E. Lamb, B.G Jenkins

Instructor Nancy Roche

Programs of study leading to the degrees of *Bachelor of Arts in Education, Master of Arts in Education, Master of Arts in Teaching, Education Specialist,* and *Doctor of Education* are offered by the School of Education (see pages 105–10

SECOND GROUP

Educ 136, 137, 138, 139, 140, 142, 144, and 146 are special methods courses which are to be elected in the senior year by students in the secondary school curriculum after substantial preparation in the teaching fields concerned. Course requirements and hours of credit vary with license requirements. Practices of successful teachers studied; actual teaching content as found in current texts and courses of study reviewed. Prerequisite to all special methods courses: Educ 108, 123, and 131. Additional prerequisites are stated under each course. Staff

108 Human Development, Learning, and Teaching (3)

Lecture (2 hours), field work (3 successive hours each week, preferably in the morning, arranged by the Director of Laboratory Experiences). Principles of effective teaching based on an understanding of human development and the nature of learning. Prerequisite: Psyc 22; Psyc 2 or 112. (Fall and spring)

111 Elementary School Curriculum and Methods (15) Moore and Staff

For seniors. Curriculum and methods of teaching in the elementary school: reading, childrens' literature, mathematics, science, language arts, social studies, music, art, physical education. Pre-student teaching one and one-half days a week. Prerequisite: Educ 108 and 123. (Fall) Staff

112 Educational Measurement (3)

Scope, needs, services to students, selection and construction of teacher-made tests, interpretation of tests for evidence purposes. Prerequisite: Educ 108 and 123. (Fall and spring) Heinle

113 Elementary School Art (3)

Lecture and laboratory (3 hours), field work—as arranged. For under-

graduates in the elementary school curriculum. Materials and methods. Material fee, $5. (Spring)

114 **Elementary School Music** (3) Daly

For undergraduates in the elementary school curriculum. Program of music activities essential to basic musical understanding. Materials and techniques.

*115 **Elementary School Teaching of Reading** (3) Heymsfeld

Introduction to methods, techniques, materials, and activities essential to a good elementary school reading program. Prerequisite: Educ 108 and 123, or teaching experience.

119 **Elementary School Curriculum and Methods** (12) Horrworth and Staff

Limited to M.A.T. students. Curriculum, methods, and materials of reading, language arts, social studies, mathematics, science, music, art, and physical education. Appropriate field experience coordinated during elementary school fall openings. (Fall)

123 **Society and the School** (3) Brenner, St. Cyr, Tillman

Historical and social development of education, contemporary issues, cooperation of the school with other community agencies, functions of school personnel. (Fall and spring)

124 **Communication Skills and Interpersonal Relationships** (3) Brenner

Theory and practice in the development of professional relationships: teacher-child, teacher-parent, teacher-supervisor, utilizing interview and other activities. (Spring)

128 **Children's Literature** (3) Walker, McIntyre

Lecture (2 hours), field work (2 hours). Newer books for children and the children's classics, contribution of literature to child development, children's original expressions. (Spring)

130 **Internship in Elementary Education** (6) Horrworth and Staff

Limited to students in the M.A.T. Program. Full-time teaching in an elementary school under cooperative supervision of the school system and the University staff. Admission by permission of instructor. Prerequisite: Educ 119, 135. (Spring)

131 **Secondary School Principles and Methods** (3) Boswell

For seniors. Classroom management and teaching techniques for initiating, guiding, and evaluating learning activities. Group-work to be arranged. Prerequisite: Educ 108 and 123. (Fall)

132 **Student Teaching in Early Childhood Schools** (6 to 9) McIntyre

For seniors. Admission by permission of instructor. Prerequisite: Educ 111 or equivalent; Educ 152, 153. (Fall and spring)

133 **Supervised Experience in Education** (3 to 6) Staff

Field work, internship, and instructional practice. Educ 133A: adult education and human resource development (Wiggs); Educ 133B: college

* This course may not be taken by students who have completed or plan to enroll in Educ 111.

student development experience (Kirkbride); Educ 133C: higher education (Angel, Frankie). Admission by permission of instructor. (Fall and spring)

134 **Student Teaching in Secondary Schools** (6 to 9) Boswell and Staff
For seniors. Admission by permission of instructor. Prerequisite: Educ 131. (Fall and spring)

135 **Student Teaching in Elementary Schools** (6 to 9) Horrworth, Moore, and Staff
For seniors and for M.A.T. students. Admission by permission of instructor. Prerequisite for seniors: Educ 111 or equivalent. Prerequisite for M.A.T. students: Educ 220. (Seniors—fall and spring; M.A.T. students—fall)

136 **Teaching English in Secondary Schools** (3) McNelis
Lecture (2 hours), field work (2 hours). Prerequisite: 18 semester hours in English. (Spring)

137 **Teaching Speech** (3) Henigan
Lecture (2 hours), field work (2 hours). Prerequisite: 18 semester hours in speech or permission of instructor. (Spring)

138 **Teaching Social Studies in Secondary Schools** (3) Boswell
Lecture (2 hours), field work (2 hours). Prerequisite: 24 semester hours of social studies. (Spring)

139 **Teaching Art in Secondary Schools** (3) Heinle
Lecture (2 hours), laboratory (2 hours). Prerequisite: 24 semester hours of Art. Material fee, $4.50. (Spring)

140 **Teaching Mathematics in Secondary Schools** (3) Gates
Lecture (2 hours), field work (2 hours). Prerequisite: mathematics through calculus. (Spring)

142 **Teaching Music in Secondary Schools** (3) Woodbury
Prerequisite: 24 semester hours of Music.

144 **Teaching Science in Secondary Schools** (3)
Lecture (2 hours), field work (2 hours). Prerequisite: 24 to 40 semester hours of science. (Spring) Arsenault

146 **Teaching Foreign Languages** (3) McIntyre
Lecture (2 hours), field work (2 hours). Prerequisite: 18 semester hours of one foreign language. (Spring)

152 **Curriculum for Early Childhood** (3) McIntyre
Admission by permission of instructor. (Spring)

153 **Early Childhood Classroom Management** (3) McIntyre
Admission by permission of instructor. (Fall)

154 **Community Resources and Materials for the Young Child** (3)
Lecture and field: use of services and specialists in community; use

new program materials. Admission by permission of instructor. (Spring)

*196 **Urban Ecology Workshop** (6)

Legal, scientific, political, and ethical aspects of specific environmental issues in the Washington metropolitan area.

THIRD GROUP

Departmental prerequisite: A degree from an accredited institution is prerequisite to all third-group courses in Education. Adequate professional preparation is prerequisite to all third-group courses in Education except for those courses limited to students in the M.A.T. Program.

201 **Seminar: International Education** (3) Moore

For elementary school teachers. Survey of selected foreign educational systems and cultures. Research, techniques, and materials to develop world-mindedness. Embassy resources utilized.

203–4 **Comparative Education** (3–3) Staff

Comparison of United States with foreign educational systems, particularly those of Russia, West Germany, Denmark, Switzerland, France, the British Isles, Canada, and Australia.

205–6 **The Curriculum** (3–3) St. Cyr

For experienced teachers. Educ 205: curriculum foundations and issues, comparison of curriculum patterns. Educ 206: curriculum development in subject areas, group consideration of student problems. (Academic year)

207 **Curriculum Materials** (3 to 6) St. Cyr

For experienced teachers. Construction of courses of study and classroom teaching aids, with direct application to students' situations.

208 **Human Development** (3) Rashid

Contribution of various disciplines to an understanding of human development throughout the life span; emphasis on practical implications of relevant research. (Fall and spring)

209 **Child Development** (3) Rashid

Interdisciplinary approach to child development. Analysis, interpretation, and practical implications for instruction of research in disciplines contributing to a knowledge of child development. (Fall)

210 **Adolescent Development** (3) Rashid

Interdisciplinary approach to adolescent growth and development. Analysis, interpretation, and practical implications for instruction of research in disciplines contributing to a knowledge of the adolescent. (Spring)

212 **Educational Measurement** (3) Staff

Basic measurement techniques; construction, selection, administration, and

* Offered jointly by the Department of Education and the Office of Program Development. Hum 196 does not have a laboratory session; therefore students receive a maximum of 4 semester hours of credit for this course. Educ 196 has a laboratory session on curricular materials for elementary and secondary school teachers; therefore teachers receive 2 additional hours of credit for a total of 6 semester hours for this course.

interpretation of objective and essay-type examinations; statistical analysis of test results; laboratory use of test instruments.

Greaver

213–14 **History of Education** (3–3)

Educ 213: European backgrounds of American education. Educ 214: evolution of the American school system. (Academic year)

Staff

216 **Education of Slow-learning Children** (3)

Identification, nature, and needs of slow-learning elementary and junior high school children. Emphasis on diagnosis and treatment of learning difficulties.

Darland

217–18 **Philosophy of Education** (3–3)

Educ 217: to help students formulate a personal philosophy of education. Educ 218: social foundations of education—forces that shape policies and offerings of the school. (Academic year)

Baker

219 **Elementary School Classroom Procedures** (3)

Current theories of teaching and learning and their application to teaching acts and strategies of elementary school teachers.

Horrworth and Staff

220 **Elementary School Teaching Foundations** (9)

Limited to M.A.T. students. Introductory block course dealing with the content of professional education courses: history and philosophy of education; educational psychology; human development, learning, and teaching; society and the school; elementary school organization. 160 class hours supplemented by field experience.

Coleman

223 **Foundations of Reading Instruction** (3)

Historical and psychological background; evaluation of recent methods, materials, and techniques in teaching reading; demonstrations of diagnosis and teaching techniques. (Fall)

Coleman

224 **Reading Problems** (3)

Elementary school reading difficulties; classroom and clinical techniques in testing and teaching. Prerequisite: one or more years of recent teaching experience and a previous course in reading or language arts. (Spring)

Coleman

226 **Reading in Secondary School and College** (3)

Methods, techniques, and materials necessary for developing efficient reading skills, including skills in content subjects; organizing and evaluating reading programs. (Spring)

Baker

227 **Basic Issues in Elementary Education** (3)

Identification, definition, and analysis of some of the most important problems facing the contemporary American elementary school. (Fall)

Baker

228 **Instructional Areas in Elementary Education** (3)

Current trends and research on reading, language arts, social studies, mathematics, science, music, art, and physical education. (Spring)

Carr

229 **Administration of Elementary Education** (3)

For experienced teachers and administrators. Achieving instructional objectives, organizing and servicing teaching activities, coordinating school and community life. (Fall)

230 **Intern Seminar for M.A.T. Students** (3) Brenner, Horrworth
(Formerly Intern Seminar: Elementary School Teaching)
Planning and supervision of individual action research projects. (Spring)

231 **Secondary School Classroom Procedures** (3) Boswell
Current classroom practices: teacher-pupil planning, group procedures, initiatory and culminating activities, individual and group evaluation techniques, teaching aids, etc.; review of recent literature.

232 **Supervision of Elementary Education** (3) Carroll
For experienced teachers and administrators with two or more years of teaching experience. Review of modern supervisory concepts including practices in the operation of the elementary school. (Spring)

233 **Audio-visual Education** (3) Kubalak
Lecture (2 hours), laboratory (1 hour). Selection, evaluation, and use of audio-visual materials; administrative problems in care, operation, maintenance, and use of such materials and equipment. Material fee, $7. (Spring)

235 **Analysis of Teaching** (3) Boswell
Techniques of analyzing teaching styles and classroom interactions. (Fall)

241 **Education of the Gifted** (3) Staff
For classroom teachers. Nature and discovery of giftedness, provisions for the gifted in regular classes, experimental projects.

243 **Human Relations in Education** (3) Marinaccio
Principles and practices in human relations between and among learner, teacher, other school personnel, and parents.

245 **School and Community** (3) Angel
The school as an important member of a team of social agencies that builds the community. (Spring)

246 **Administrative Issues in Urban Education** (3) Drachler
Investigation of current issues in urban education. (Spring)

247 **Adult Occupational Education** (3) Wiggs
Development, current concepts, agencies involved, problems, and trends in adult vocational-technical-occupational education in the United States and foreign countries.

251 **Foundations of Guidance and Personnel Services** (3) Detwiler
Introductory survey: definitions, scope, principles, historical background, organization, services, emerging trends, and issues. (Fall and spring)

252 **Organization and Administration of Guidance Services** (3) Vontress
Procedure and practice in organizing and administering school guidance and pupil personnel programs. Admission by permission of instructor. (Spring)

253 **Analysis of the Individual for Purposes of Counseling** (3) Winkler
Detailed study of individual analysis and appraisal techniques. Development of systematic case study. Prerequisite: Educ 112 or equivalent. (Fall and spring)

254 **The Middle School** (3) Atkins
Purposes, organization, core program, guidance, developing course of study, extra-classroom activities. (Fall)

255–56 **Secondary Education** (3–3) Staff
Educ 255: current proposals for improvement of secondary education. Educ 256: current problems in each subject-matter field. (Academic year)

257 **Educational and Occupational Development** (3) Sinick, Vontress
Theories of career development; factors influencing the world of work; procedures for evaluating and using socio-personal, educational, and occupational information. (Fall and spring)

258 **Techniques of Counseling** (3) Detwiler, Vontress
Theories and practices of vocational, educational, and personal counseling. Prerequisite: 12 semester hours in guidance and counseling, including Educ 253 and 257. (Fall and spring)

259 **Secondary School Administration** (3) Marinacco
For experienced teachers and administrators. Survey of administration including practices of the modern high school. (Fall)

260 **Secondary School Supervision** (3) Marinacco
For experienced teachers and administrators. Review of modern supervisory concepts including practices in schools. (Spring)

261 **Practicum in Guidance** (3 to 6) Vontress, Detwiler
Supervised experience in counseling and guidance. Prerequisite: 12 semester hours in counseling and guidance. Admission by permission of Department Chairman. (Fall and spring)

263 **Human Resource Development: Training and Education** (3) Wigg
Concepts and purpose, historical backgrounds, emerging roles of human resource development personnel, program areas. Prerequisite: adequate professional preparation or experience in training, education, and development. (Fall)

264 **Program Planning in Human Resource Development** (3) Nadler
Training, education, and development programs for various client systems will be planned using critical events conceptual model. Field work. Prerequisite: Educ 263 and permission of instructor. (Spring)

269–70 **School Business Management I–II** (3–3) Marinacco
Educ 269: philosophy, responsibilities, and functions of the business management office in public education institutions. Educ 270: practicum in educational business management. (Academic year)

271 **The Teacher and School Administration** (3) Carroll, Marinacco
Role of federal, state, and local administrative units; school finance; legal

controls; school plant; public support; improving teaching conditions. (Fall and spring)

272 **The Teacher and School Supervision** (3) Carroll, Marinaccio

Nature, organization, human relationships, and techniques. (Fall and spring)

273–74 **Teacher Education** (3–3) Boswell

Educ 273: aims, objectives, and basic issues; study of outstanding and experimental programs. Educ 274: recruitment and selection, general education, teaching-field preparation, professional sequences, laboratory experiences. (Academic year)

275 **Seminar: School Finance** (3) Carroll

Educational financial theory, practice, and control, including methods of financing. (Fall)

276 **Seminar: Public Relations in School Administration** (3) Carroll

Purposes, gathering materials, disseminating agencies, publicity media, public participation in policy-making. (Spring)

278 **School Law** (3) Ware

Sources and scope of school law; legal rights and responsibilities of teachers, pupils, and taxpayers. Other legal problems of major interest to the group. (Spring)

279 **Adult Education** (3) Nadler

Current concepts and objectives, historical development, agencies involved, personnel, clients, programs on all levels—community through international. (Fall)

280 **Program Planning in Adult Education** (3) Wiggs

Determining educational needs for adults at all levels in school and nonschool agencies; planning programs and instruction; budgeting and scheduling of adult programs. Field work with actual sponsoring agency. Prerequisite: Educ 279 and permission of instructor. (Spring)

283 **Higher Education in the United States** (3) Angel

Development, scope, purpose, present status, programs, and trends in higher education in the United States. (Fall)

284 **Administration of Higher Education** (3) Angel, Elliott, and Staff

Government, organization, and administration of colleges and universities; duties of trustees and administrators. (Fall and spring)

285 **Student Activities** (3) Angel

Nature and purposes of selected activities—homeroom, clubs, assemblies, school publications, student council, interscholastic contest; attention to sponsorship, participation, finance, and evaluation.

287–88 **Clinical Study of Reading Problems** (3–3) Coleman, Peterson

For advanced students. Diagnostic and corrective work under supervision in the Reading Center. Prerequisite: Educ 223 and 224 or 226, or equivalent. Material fee, $10 a semester. (Academic year)

289 **Supervisory Problems in Reading** (3) Peterson

For experienced teachers, principals, supervisors, and superintendents. Problems in planning, reorganizing, and improving the total reading program. (Fall)

290 **Diagnosis and Instruction—Severe Reading Problems** (3) Peterson

For experienced teachers. Case studies of children and/or adults with severe reading problems, planning and implementing instructional programs. Admission by permission of instructor. Material fee, $10. (Spring)

291 **Planning the School Plant** (3) Chase

Selection of sites; evaluation of existing buildings; utilization of present facilities; adaptation to curricular needs; building, operation, and maintenance problems. (Fall)

293–94 **Research and Independent Study** (3–3) Staff

Individual research under guidance of a staff member. Program and conferences arranged with an instructor. (Academic year)

295 **Research Methods and Procedures** (3) Staff

Required of all candidates for graduate degrees in Education. To be taken early in the graduate program. (Fall and spring)

296 **Seminar: Educational Research** (3) Staff

Analysis of scientific approaches to problems in education and evaluation of the application of research techniques. Required of all candidates for the Ed.D. degree. Prerequisite: Educ 295 and Stat 105; or equivalent. (Fall and spring)

297 **Personnel Administration** (3) Carroll

Organization and administration of personnel programs for educational institutions. Basic philosophy, principles, responsibilities, and functions.

298 **Seminar: Personnel Administration** (3) Carroll

Research: policies, rules and regulations, staff organizations, negotiations. Staff

299–300 **Thesis Research** (3–3)

Required of Master of Arts in Education candidates writing Master's theses. (Fall and spring)

301 **Data Processing in Education** (3) McCarthy

Machine accounting and computer technology for counselors, teachers and administrators.

303 **Data Analysis** (3) Linkowski

Use of computer in data analysis. For doctoral students at the dissertation planning stage. (Fall)

316 **Curriculum Developments in Elementary School Social Studies** (3 to 6) Moore

For experienced educational personnel. Research, techniques, materials and innovative programs relating to the effective elementary school social studies curriculum. Admission by permission of instructor.

317 **Curriculum Developments in Elementary School Science** (3 to 6) St. Cyr

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school science curriculum. Admission by permission of instructor.

320 **Curriculum Developments in Elementary School Mathematics** (3 to 6) St. Cyr

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school mathematics curriculum. Admission by permission of instructor. (Spring)

321 **Practicum in Curriculum** (3 to 6) St. Cyr

Supervised field experience in curriculum. Admission by permission of instructor. (Fall and spring)

331 **Development of the Young Child** (3) McIntyre

Lecture and laboratory. Basic concepts and problems of child development; observation, behavior patterns, child study. (Fall)

332 **Curriculum for Early Childhood** (3 or 4) McIntyre

Lecture and field. Language arts, science, mathematics, health, social studies, and creative arts—adapting to skills and needs of the young child; content of new programs. (Spring)

333 **Early Childhood Classroom Management** (3 or 4) McIntyre

Lecture and field. Planning, reporting, records, equipment, testing, working with parents and aides. (Fall)

334 **Community Resources and Materials for the Young Child** (3 or 4) McIntyre

Lecture and field. Use of services and specialists in community; use of new program materials. (Spring)

335 **Practicum in Early Childhood Education** (3 to 6) McIntyre

Supervised teaching and seminar in the early childhood field. Prerequisite: Educ 331, 332, and 333; or equivalent; and permission of instructor. (Fall and spring)

336 **Practicum in Reading** (3) Coleman, Peterson, and Staff

Supervised experience in testing and teaching in the Reading Center. Approximately 120 class hours required. Laboratory fee, $10. Admission by permission of instructor. (Fall and spring)

341 **Cognitive Models and Instructions** (3) Rashid

Cognitive models (Guilford, Piaget, etc.) are analyzed as the theoretical basis for planning instructional episodes appropriate at various levels—childhood through young adulthood. (Fall)

342 **Language Development** (3) Rashid

Nature of language development; role of language in the socialization process. (Spring)

354 **Counseling of Minority Groups** (3) Vontress

Consideration of problems and approaches related to counseling cultural

and racial minorities in American society; emphasis on counseling the disadvantaged in urban areas.

Rollins

355 **Counseling in Groups** (3)

Principles of group dynamics as related to interaction within groups. Techniques and practice in group counseling. (Fall)

Staff

356 **Seminar: Guidance and the Disciplines** (3)

For experienced counselors. Exploring the foundations of guidance through the disciplines of psychology, sociology, economics, anthropology, and philosophy.

Winkler

357 **Mental Hygiene** (3)

Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents. (Fall and spring)

Sinick

361 **Medical Aspects of Rehabilitation Counseling** (3)

Etiology, symptomatology, and treatment of chronic and traumatic disorders with rehabilitation counseling implications. Admission by permission of instructor. (Fall)

Sinick

362 **Client Evaluation in Rehabilitation Counseling** (3)

Test and nontest methods of furthering client and counselor understanding. Prerequisite: Psyc 131. (Spring)

Linkowski

363 **Psychosocial Aspects of Rehabilitation Counseling** (3)

Impact of congenital and later disabilities on attitudes, self concepts, and motivations. Implications for rehabilitation counseling. Admission by permission of instructor. (Fall)

Sinick

365–66 **Field Work in Rehabilitation Counseling** (3–3)

Field work of one full day a week. Educ 365: concurrent seminar covering history, philosophy, and introduction to practices. Educ 366: concurrent seminar covering job analysis, placement, and follow-up. Admission by permission of instructor. (Academic year)

Linkowski

367–68 **Internship: Rehabilitation Counseling** (6–6)

Supervised practice of three full days a week, with seminar providing integration of theory and practice. Prerequisite: Educ 365–66. (Academic year)

Sinick

369 **Professional Issues in Rehabilitation Counseling** (3)

Culminating seminar covering professional problems and ethical issues. Prerequisite: Educ 367. (Spring)

Frankel

371 **Introduction to College Teaching** (3)
(Formerly Principles and Methods of College Teaching)

General principles, methods, techniques, and experimental instructional media for teaching at the college and university level. (Fall)

Frankel

372 **Internship in College Teaching** (3 to 6)

Supervised experience in a selected area of college teaching. Prerequisite: Educ 371. Admission by permission of instructor. (Spring)

Angel, Frankel

373 **The Junior-Community College** (3)

The two-year college as it relates to secondary education, four-year col-

leges, and universities. Objectives, curricula, students, faculty, legal concerns, and special problems of two-year colleges. (Fall)

374 **Current Issues in Higher Education** (3) Elliott, Angel
Prerequisite: Educ 283, 284. (Spring)

375 **Foundations of a College Student Development Program** (3) Kirkbride
(Formerly Introduction to Student Personnel Work)
College student development as an integral part of higher education programs. (Fall)

376 **College Student Development and Campus Groups** (3) Kirkbride
(Formerly Student Personnel Work with College Groups)
Principles and procedures of student development programs with campus groups; campus group activities and development of student leadership. (Spring)

377 **Practicum in College Student Development** (3 to 6) Kirkbride, Phelps
(Formerly Practicum in Student Personnel Work (3))
Supervised practical experience in college student development programs. Admission by permission of instructor. (Fall and spring)

378 **Practicum in Teacher Education** (3 to 6) Brenner, Boswell
For selected experienced teachers. Supervised field work relevant to student's professional needs, to be arranged. (Fall and spring)

379 **Practicum in Adult Education** (3 to 6) Nadler
Supervised practical experience in various forms of adult education and human resource development. Admission by permission of instructor. (Fall and spring)

380 **Sensitivity Training: Laboratory Method** (3) Drexler, McCune
A sensitivity learning experience in human relations using unstructured group experience, individual feedback, experimentation, and practice. Admission by permission of Department, prior to registration. (Fall and spring)

381 **The Adult as a Learner** (3) Angel, Wiggs
Psychology of learning as applied to adults; effect of age on learning; physical and social environment in adult education situations. (Fall)

382 **Methods in Adult Education** (3) Nadler, Lamb
Methods, techniques, and devices in adult education; traditional methods, developing action-oriented learning situations, programmed instruction, and systems approach in developing training programs. (Spring)

383 **Counseling of Adults** (3) Wiggs
Theories and practical applications of occupational counseling, emphasizing distinct needs of adults and young adults; primarily intended for counselors in military, government, business, and industrial organizations. (Spring)

384 **Evaluation of Adult Education** (3) McCune
Measurement and evaluation of adult education in school and nonschool

agencies—business, industry, government, voluntary organizations, and community. (Spring)

386 **Current Issues in Adult Education** (3) Wiggs, Holden
(Spring)

387 **Administration of Adult Education** (3) Nadler
Program administration, staff recruitment and development, fiscal operations, facilities, and maintenance of effective community relations.

389 **Consultant-Client Relationship in Human Resource Development** (3) Nadler
(Fall)

390 **Legal Problems in Higher Education** (3) Franks
Investigation of legal problems in higher education related to administration, students, faculty, and academic program. (Spring)

391 **College and University Curriculum** (3) Franks
Development, patterns, creative design, issues, problems, evaluation, and trends in the higher education curriculum. (Fall)

392 **Financing Higher Education** (3) Franks
Analysis of private, state, and federal revenue sources; student aid, program budgets, and financial methods and practices. (Spring)

393 **Practicum in Higher Education** (3 to 6) Angel
Supervised field experiences in higher education; reports and conferences. Admission by permission of instructor. (Fall and spring)

394 **College and University Governance** (3) Marinaccio
(Formerly Administration and Governance in Higher Education)
Organizational and administrative structures, patterns, and relationships in higher education. Prerequisite: Educ 284. (Fall)

395 **Problems and Practices in School Administrative Organization** (3 to 6) Marinaccio
Application of principles and supervision concerned with change and evaluation of administrative organization. Angel

396 **Internship: Higher Education Administration** (3 to 6)
Service in a higher education situation directed by the University and a cooperating institution to integrate theory and practice. Carroll

397 **Internship: Elementary Administration** (3 to 6)
Service in a school situation directed by the University and school system to integrate theory and practice. (Fall and spring) Marinaccio

398 **Internship: Secondary Administration** (3 to 6)
Service in a school situation directed by the University and school system to integrate theory and practice. (Fall and spring) Carroll

399 **Seminar: Applied Educational Administration** (3 to 6)
Application of the theories and principles of administration to the public schools. Student participation with guidance by recognized regional practitioners.

RTH GROUP

Master's degree from an accredited institution is prerequisite to all fourth-group ses. All fourth-group seminars are open to doctoral candidates or other post-ter's degree students with approval of instructor. Study is individually planned the basis of previous study and experience in the subject field to attain an advanced l of competence and meet identified professional needs or field requirements. ach of the following courses is offered fall and spring. Each course may be re-ed for credit.

401 **Seminar: History of Education** (arr.) — Greaver

403 **Seminar: Philosophy of Education** (arr.) — Darland

405 **Seminar: Human Growth and Development** (arr.) — Rashid

411 **Seminar: Elementary Education** (arr.) — Baker

413 **Seminar: Secondary Education** (arr.)

421 **Seminar: Adult Education** (arr.) — Wiggs, Nadler

422 **Seminar: Higher Education Administration** (arr.) — Marinaccio, Angel

423 **Seminar: Higher Education** (arr.) — Angel

424 **Seminar: College Student Development** (arr.) — Kirkbride
(Formerly Seminar: Personnel Work in Higher Education)

425 **Seminar: Teacher Education** (arr.) — Boswell, Baker

427 **Seminar: Human Resource Development** (arr.) — Wiggs, Nadler

429 **Seminar: Educational Personnel Administration** (arr.) — Carroll

431 **Seminar: Administration** (arr.) — Carroll, Marinaccio

433 **Seminar: Supervision** (arr.) — Carroll, Marinaccio

434 **Seminar: Elementary Supervision** (arr.) — Carroll

435 **Seminar: Elementary Administration** (arr.) — Carroll

436 **Seminar: Secondary Supervision** (arr.) — Marinaccio

437 **Seminar: Secondary Administration** (arr.) — Marinaccio

441 **Seminar: Curriculum** (arr.) — St. Cyr

443 **Seminar: Guidance and Counseling** (arr.) — Detwiler, Vontress

445 **Seminar: Research and Evaluation** (arr.) — Rashid, Linkowski

490 **Dissertation Seminar** (3) — Staff
Required of all Ed.D. degree candidates. Approval of the dissertation prospectus is necessary for successful completion of the seminar.

491 **Dissertation Research** (arr.) — Staff
Preparation of a research outline; research and writing of an approved doctoral dissertation under the direction of major adviser and dissertation committee. Prerequisite: Educ 490.

English

Professors C.D. Linton, C.W. Cole, R.H. Moore, J.H. Coberly, P.H. Highfill, Jr., J.G. Allee, Jr., J.P. Reesing, Jr. (*Acting Chairman*), Milton Crane, E.R. Weismiller, R.N. Ganz, Jr., G.E. McCandlish

Adjunct Professor J.C. Broderick

Associate Professors W.L. Turner, Muriel McClanahan, A.E. Claeyssens, Jr., R.C. Rutledge

Assistant Professors J.A. Quitslund, J.W. Claiborne, Fredrica Rosenberg, Judith Plotz, Nancy Bunge, T.M. Scanlan, C.W. Sten, G.R. Bozzini

Adjunct Assistant Professors Barbara Dunham, Sister Mary Francis Slattery

Instructors Margaret Bonney, R.L. Dabney, Hazel Eagle, Judith Carlberg, Judith Lefkowitz, Agnes Cannon, R.L. Combs, M.E. Green, J.J. O'Connell, Jr., Anne Richardson

Lecturers Edgar Boling, Jr., Elna Broffman, Joan Gimlin, Betty Pasta, Shirley Hafezi, D.H. Bowman, Monica Finkel, Catherine McGraw, Ann Romines

Bachelor of Arts with a major in American Literature or *English Literature (Departmental).*—The departmental major in American or English Literature offers an opportunity for gaining some familiarity with several approaches to literature which, together, make a discipline of literary study—practical criticism, history of literature, literary period(s), genre(s), and major author(s). The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirements for "meaningful initiation" into the Social Studies and the Natural and Mathematical Sciences.)

2. Prerequisite courses—Engl 51–52 or 71–72 or 91–92.

3. Required courses in related areas—(a) 12 semester hours of a college-level foreign language (Classical Hebrew, Greek, Latin, French, German, Italian, Russian, or Spanish), or equivalent; (b) 6 semester hours of Philosophy and/or Religion; (c) 6 semester hours of History (English, American, European, or World).

4. Required second-group courses for American Literature majors—24 semester hours of American Literature courses, including Engl 161–62; 6 hours of English Literature courses.

Required second-group courses for English Literature majors—15 semester hours of English Literature courses, including Engl 121, 122, a 3-hour course on a literary period, a 3-hour course on a genre, and a 3-hour course on a major author; 12 semester hours of American Literature; and 12 additional hours of courses offered by the Department of English of which at least 9 hours must be in English Literature.

Bachelor of Arts with a major in American Literature or *English Literature (Field-of-Study).*—This major, in which the student prepares for the major examination at the end of his senior year, prescribes no set pattern of courses. The student is expected to engage himself more or less systematically with writers and works from the whole chronological span of American literature or English literature. The field-of-study major offers an opportunity during the student's senior year for work in special seminars, and, for honors candidates, independent study. Students are required to pass a major examination at the end of the senior year. A proseminar, Engl 199–200, assists students preparing for the major examination in American Literature; a senior seminar, Engl 159 and/or 160, assists students preparing for the major examination in English Literature. *Students who wish to be candidates for graduation with Special Honors in either American or English Literature must be in the field-of-study major.*

Students must fulfill the following requirements:

1. The general requirements as stated on pages 78, 83–88. (Students should

sult the departmental adviser regarding courses to be taken in satisfying the irements for "meaningful initiation" into the Social Studies and the Natural and thematical Sciences.)

Prerequisite courses—Engl 51–52 or 71–72 or 91–92.

Required courses in related areas—(a) 12 semester hours of a college-level gn language (Classical Hebrew, Greek, Latin, French, German, Italian, Rus-, or Spanish), or equivalent; (b) 6 semester hours of Philosophy and or Re-on; (c) 6 semester hours of History (English, American, European, or World).

Master of Arts in the field of American Literature.—Prerequisite: the degree of helor of Arts with an undergraduate major in English, or 24 semester hours in glish and/or American literature above the sophomore level.

Required: the general requirements, pages 93–100, including (1) 24 semester hours course work planned in consultation with the adviser on the basis of the stu-'s undergraduate preparation, including a minimum of 6 semester hours in glish literature; (2) a written Master's Comprehensive Examination; (3) a Mas-'s thesis (6 semester hours) written on an approved topic under the direction the instructor in whose field the major portion of the material falls, or, with the roval of the Department adviser, 12 additional semester hours in lieu of thesis.

Master of Arts in the field of English Literature.—Prerequisite: the degree of helor of Arts with an undergraduate major in English or American Literature at University, or 24 semester hours in English and/or American literature above sophomore level.

Required: the general requirements, pages 93–100, including (1) 24 semester hours course work, planned in consultation with the adviser; (2) a written Master's Com-hensive Examination; and (3) a Master's thesis (6 semester hours) written on approved topic under the direction of the instructor in whose field the material , or, with the approval of the Department adviser, 12 additional semester hours u of thesis.

Doctor of Philosophy in the field of American Literature.—Required: the general irements, pages 93–97, 100–102; high-level proficiency in an appropriate foreign guage; the passing of a General Examination in four of the six following fields: Early American Literature—to 1815, (2) American Fiction, (3) American try, (4) American Romanticism, (5) American Realism, (6) English Literature— of the first seven fields listed below under "Doctor of Philosophy in the field English Literature." Each student plans his program in consultation with a de-mental committee.

Doctor of Philosophy in the field of English Literature.—Required: the general irements, pages 93–97, 100–102; high-level proficiency in an appropriate foreign guage; the passing of a General Examination in four of the eight following fields: beginnings to 1500, Linguistics, and History of the Language; (2) 1500–1660; 1660–1800; (4) 1800–1900; (5) 1900 to Present; (6) Drama, including Shake-e; (7) Criticism; (8) American Literature—one of the first five fields listed e under "Doctor of Philosophy in the field of American Literature." Each dent plans his program in consultation with a departmental committee.

Bachelor of Arts in Education with a teaching field in English.—Prerequisite: the cation curriculum, pages 80–81.

Required: the English option and the professional courses listed on pages 112–13,

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tudents whose College Board English Composition Achievement Test scores sug-inadequate preparation may be assigned to Engl 1*x* or may be tested in vo-lary, spelling, grammar, standard usage, and writing skill, before placement in er Engl 1*x* or 1. Students whose scores and/or writing skill indicate superior petence will be allowed to waive Engl 1; those whose scores indicate markedly nor competence will be allowed to waive both Engl 1 and Engl 2 or 4.

Departmental prerequisite: Engl 1 or 1*x* is prerequisite to all other courses in English. A 6-semester-hour course in literature, or equivalent, or written permission of the instructor, is prerequisite for admission to all second-group courses in English except Engl 115 and 161–62.

ENGLISH COMPOSITION

FIRST GROUP

Staff

A English for Foreign Students (3)

Reading and writing to assist the foreign student in overcoming deficiencies in the use of English. Special attention to spelling, syntax, grammar, idiom, and vocabulary. (Fall and spring)

Staff

B English for Foreign Students (3)

For second-semester foreign students not ready for Engl 1. Writing of expository paragraphs and themes; outlining; reading for comprehension; vocabulary, and style. (Fall and spring)

Moore and Staff

1 English Composition: Language as Communication (3)

Study and practice of expository techniques; emphasis on the rhetorical complexities of unity, development, organization, and coherence, by analysis of selected current books; library research procedure. (Fall and spring)

Moore and Staff

1*x* English Composition: Language as Communication (3)

Intensive course in English grammar and composition for students inadequately prepared for Engl 1. Begins with detailed instruction, drill, and exercises in basic structure of the English language and in writing paragraphs; continues with content of Engl 1. Engl 1*x* meets five hours a week and carries 3 semester hours of credit. Total fee, $265 (tuition of $240 plus additional fee of $25). (Fall and spring)

Moore and Staff

2 English Composition: Language and the Arts and Sciences (3)

Study and practice of expository and argumentative techniques; emphasis on the rhetorical complexities of the sentence and of diction, and on logical thought, by analysis of selected books on the nature of language and of the arts and sciences. Prerequisite: Engl 1 or 1*x*. Students who receive credit for Engl 2 cannot receive credit for Engl 4. (Fall and spring)

Moore and Staff

4 English Composition: Language in Literature (3) *(Formerly Engl 40)*

Study and practice of expository and argumentative techniques through critical writing; emphasis on the rhetorical complexities of stylistics in the sentence and in diction, and on logical thought, by the study of literary genres and of the use of language in literature. Prerequisite: Engl 1 or 1*x*. Students who receive credit for Engl 4 cannot receive credit for Engl 2. (Fall and spring)

ONd GROUP

101 **Expository Writing** (3) McClanahan, Moore

Types of expository writing; weekly exercises based on students' needs; particular attention may be given to problems in the writing of graduate theses. Prerequisite: Engl 1 or 1x; 2 or 4. (Fall)

102 **Narrative Writing** (3) Weismiller, Claeyssens

Techniques of narrative writing; class criticism of student writing. Prerequisite: Engl 1 or 1x; 2 or 4; consent of instructor. To apply for the instructor's consent a student should, before registration, submit samples of his writing. (Fall and spring)

103 **The Writing of Fiction—the Short Story** (3) Claeyssens

Prerequisite: Engl 102, consent of instructor. To apply for the instructor's consent a student should, before registration, submit a sample of his writing. (Fall)

105–6 **The Writing of Plays** (3–3) Claeyssens

Prerequisite: Engl 1 or 1x; 2 or 4; consent of instructor. To apply for the instructor's consent a student should, before registration, submit a sample of his writing.

107 **The Writing of Fiction—the Novel** (3) Claeyssens

Prerequisite: Engl 102 or 103, consent of instructor. To apply for the instructor's consent a student should, before registration, submit a sample of his writing. (Spring)

108 **Advanced Writing—Poetry and Prose** (3) Weismiller

Prerequisite: Engl 1 or 1x; 2 or 4; consent of instructor. To apply for the instructor's consent a student should, before registration, submit a sample of his writing.

NGLISH LITERATURE

RST GROUP

51–52 **Introduction to English Literature** (3–3) Weismiller and Staff

Historical survey. (Engl 51 and 52—fall and spring)

91–92 **Introduction to European Literature** (3–3) Crane and Staff

Consideration of various types. (Engl 91 and 92—fall and spring)

COND GROUP

111 **Medieval English Literature—Exclusive of Chaucer** (3) Allee

112 **Chaucer** (3) Allee

(Spring)

115 **Introduction to English Linguistics** (3) Allee

Development of the English language in a historical treatment of English grammar. (Fall)

116 Medieval Legend and Saga (3)
Celtic and Norse.

117 English Poetry: Form and Content (3)
Medieval period to the 20th century.

121 Practical Criticism (3)
(Formerly Engl 122)
(Fall)

122 History of English Literature (3)
(Formerly Engl 121)
(Spring)

123 Principles of Literary Criticism (3)

125–26 Elizabethan Verse and Prose (3–3)
Engl 125: survey of nondramatic literature. Engl 126: detailed study of major writers and genres. (Academic year)

127–28 Shakespeare (3–3)
(Academic year)

129 The Earlier 17th Century (3)
Poetry and prose to 1660, exclusive of Milton. (Fall)

130 Milton (3)
(Spring)

131–32 English Literature, 1660–1780 (3–3)
Poetry and prose of the Neoclassic period. Engl 131: 1660–1740. Engl 132: 1740–1780.

133–34 The Romantic Movement (3–3)
Engl 133: survey of poetry and prose, 1780–1830. Engl 134: detailed study of major writers and genres. (Academic year)

135–36 Victorian Literature (3–3)
Engl 135: survey of poetry and prose, 1830–1900. Engl 136: detailed study of major writers and genres. (Academic year)

137–38 The 20th Century (3–3)
Literature since 1900. Engl 137: poetry and criticism. Engl 138: drama and the novel. (Academic year)

152 Introduction to Contemporary Poetry (3)
Study of works by representative contemporary poets, with particular attention to the mythic tradition in poetry.

153–54 The English Novel (3–3)
Major novelists. Engl 153: 18th century. Engl 154: 19th century. (Academic year)

55–56 **The English Drama** (3–3) Crane

Engl 155: principally the drama of Shakespeare's contemporaries. Engl 156: historical survey, 1660 to present. (Academic year)

59–60 **Senior Seminar in English Literature** (3–3) Quitslund, Plotz

(Formerly Proseminar in English Literature)

Engl 159: varieties of the Quest Romance from *Sir Gawain and the Green Knight* to the *Lord of the Rings* and *Divine Right's Trip*. Engl 160: study of periodization in English literary history—an examination of major theories of periodization as applied to the shift from neoclassicism to romanticism through the concept of the sublime. (Academic year)

197 **Independent Study** (3) Reesing and Staff

Open to honors candidates in the field-of-study major during their senior year. (Fall and spring)

198 **Senior Honors Thesis** (3) Reesing and Staff

An independent-study course in which, under the guidance of an instructor, the student writes a thesis on an approved topic. Open to qualified seniors in the field-of-study major in English Literature. (Fall and spring)

RD GROUP

212 **Studies in Chaucer** (3) Allee

13–14 **Old English** (3–3) Allee

English language and literature before 1100. Engl 213: Old English grammar and readings. Engl 214: *Beowulf*. (Academic year)

217 **English Poetry: the Formal Development** (3) Weismiller

218 **Form and Content in Modern Poetry** (3) Weismiller

219 **Research Methods and Bibliographical Materials** (3) Broderick

To acquaint graduate students with the principal sources of bibliography and the typical problems in research. (Fall)

220 **Studies in Modern Dramatic Literature** (3) Crane

221 **Studies in Comic Literature** (3) Crane

23–24 **Studies in Literary Criticism** (3–3) Slattery

(Academic year)

25–26 **Studies in 16th Century English Literature** (3–3) Quitslund

27–28 **Studies in Shakespeare and His Contemporaries** (3–3) Crane

(Academic year)

229 **Studies in English Literature 1600–1660** (3) Reesing

Chief figures exclusive of Milton.

230 **Studies in Milton** (3) Reesing

31–32 **Studies in English Literature, 1660–1780** (3–3) Highfill

(Academic year)

233–34 **Studies in the Romantic Movement** (3–3)

235–36 **Studies in Victorian Literature** (3–3)
(Engl 235: fall)

237–38 **Studies in 20th Century Literature** (3–3)

242 **Renaissance Intellectual History** (3)
Offered in collaboration with the Folger Shakespeare Library Institute o
Renaissance and 18th Century Studies.

253–54 **Seminar: the English Novel** (3–3)

255–56 **Studies in Dramatic and Theatrical History** (3–3)
Engl 256: seminar in Restoration and the 18th Century Theater bas
among the Folger Library collections.

299–300 **Thesis Research** (3–3)
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general e
amination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for cred
(Fall and spring)

AMERICAN LITERATURE

FIRST GROUP

71–72 **Introduction to American Literature** (3–3)
Historical survey. Engl 71: from beginnings to the Civil War. Engl
from the Civil War to present. (Engl 71 and 72: fall and spring)

SECOND GROUP

161–62 **Studies in American Literature** (3–3)
Same as AmCv 161–62. Major factors in the national cultural trad
as shown by outstanding writers. Prerequisite: Engl 51–52 or 71–
(Academic year)

163–64 **Major American Poets** (3–3)
Advanced critical study of significant writers and movements. Engl
from beginnings through the 19th century. Engl 164: the 20th centu
(Academic year)

165–66 **American Drama** (3–3)
Historical and critical study of significant plays and forms. Engl
from beginnings to 1930. Engl 166: since 1930. (Academic yea

67–68 **The American Novel** (3–3) Coberly

Historical and critical study of significant novels. Engl 167: from beginnings through the 19th century. Engl 168: 20th century. (Academic year)

170 **The American Short Story** (3) Coberly

Historical development of the short story in America.

71–72 **Major American Writers** (3–3) Sten, Combs

Engl 171: Edward Taylor, Herman Melville, and Henry Adams—a study in Puritan influence. Engl 172: modern Southern writers. (Academic year)

73–74 **Selected Literary Movements** (3–3) Bunge, Green

Engl 173: the flowering of the Midwest—Midwestern literature and its cultural backgrounds, 1912–1964. Engl 174: literature of the 1930s—the relationship between literature and ideology during a decade of social change. (Academic year)

75–76 **Special Topics in American Literature** (3–3) Green

77–78 **Contemporary American Literature** (3–3) Ganz, Claeyssens

(Academic year)

197 **Independent Study** (3) Reesing and Staff

Open to honors candidates in the field-of-study major during their senior year. (Fall and spring)

198 **Senior Honors Thesis** (3) Reesing and Staff

An independent-study course in which, under the guidance of an instructor, the student writes a thesis on an approved topic. Open to qualified seniors in the field-of-study major in American Literature. (Fall and spring)

-200 **Proseminar in American Literature** (3–3) Scanlan and Staff

For field-of-study majors in American Literature. Readings, conferences, and group discussions. (Academic year)

GROUP

219 **Research Methods and Bibliographical Materials** (3) Broderick

To acquaint graduate students with the principal sources of bibliography and the typical problems in research. (Fall)

63–64 **Studies in American Poetry** (3–3) Ganz

(Engl 263: fall)

67–68 **Seminar: American Fiction** (3–3) Coberly

Research and critical reading: fiction and the criticism of fiction.

270 **Seminar: the American Short Story** (3) Coberly

81–82 **Seminar: Early American Literature** (3–3) McCandlish

Same as AmCv 281–82.

283–84 **Studies in American Transcendentalism** (3–3) Brodeur
(Engl 284: Melville's early fiction—spring)

285–86 **Seminar: American Literature, 1865-1900** (3–3) Coberly
(Formerly Engl 284 Seminar: American Literature, 1865–1900 (3))
Realism in America. (Academic year)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

367–68 **Readings in American Fiction** (3–3) Coberly
For graduate students only. Literature and the critical materials on which graduate students are responsible on the Doctor of Philosophy general examination. (Academic year)

381–82 **Readings in Early American Literature** (3–3) McCandlish

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit.
(Fall and spring)

Epidemiology and Environmental Health

Professor J.W. Millar (*Chairman*)
Associate Professor C.R. Hartman
Associate Clinical Professors W.J. Zukel, L.S. Jaffe
Assistant Professors E.N. Kassira, Yousef Al-Doory, F.L. Hurley (*Biostatistics*)
Assistant Clinical Professors Lawrence Pyle, Jr., John Vinyard, Jr.
Assistant Professorial Lecturers S.H. Barboo, Jr., N.E. Manos, J.A. Lee, Olga Joly, D.V. Lassiter

Bachelor of Science in Environmental Health.—This degree program of Columbian College of Arts and Sciences is offered off campus and is administered by the College of General Studies. Interested students should request the *College of General Studies* catalogue.

Master of Science in the field of Mycology.—An interdepartmental degree offered by the departments of Biochemistry, Epidemiology and Environmental Health, and Microbiology.

Prerequisite: a Bachelor's degree with a major in Biology, Botany, Chemistry, Zoology from this University, or an equivalent degree. The undergraduate program should have included the following courses, or equivalent: B Sc 11–12; Chem 11–12, 51–52, 53–54.

Required: the general requirements, pages 93–100. Candidates must complete either (1) a minimum of 34 semester hours including Epid 299-300 *Thesis Research*, or (2) a minimum of 40 semester hours without a thesis. The required courses in the program are Bioc 221–22; Epid 201, 217, 230 (2 semester hours); Micr 201, 231.

Doctor of Philosophy *field of study in Human Ecology.*—See pages 93–97, 100–02, for requirements for the degree.

201 **Introduction to Epidemiology and Environmental Health** (2) — Millar and Staff

Required for medical students; open to qualified graduate students. Principles and methodology of epidemiology and biostatistics. Ecological approach to health and disease, including parasitology and mycology. (Spring)

217 **Clinical Mycology** (2 or 4) — Al-Doory
(Formerly Advanced Mycology)

Study of clinical aspects of mycotic diseases; emphasis on diagnosis of disease and identification of etiologic agents. (Fall)

218 **Medical Parasitology** (1 or 2) — Millar and Staff

For medical students; open to qualified graduate students. Study of host-parasite relationships. Clinical recognition of the important parasites in medicine. (Fall)

219 **Malariology** (1) — Kassira and Staff

The general principles of the diagnosis, life cycle, pathogenicity, treatment, and prevention of malaria. Prerequisite: Epid 201 or equivalent (Fall)

230 **Biostatistics** (2 or 4) — Hurley, Manos

Introduction to statistical analysis, theory of measurements and distribution, including significance testing, basic concepts of probability and association, sampling techniques, design of experiments, and introduction to computers. (Fall and spring)

239 **Introduction to Computer Applications in Health Sciences—FORTRAN** (1) — Millar and Staff

Orientation to the use of large computers in a medical environment. Use of FORTRAN, a computer independent language, for the solution of simple computational tasks. (Fall and spring)

240 **Computer Applications in Health Sciences—PL/1** (1) — Millar and Staff

Introduction to the use of PL/1 for the solution of advanced computational tasks. (Fall and spring)

295 **Research in Epidemiology** (arr.) — Staff

Participation in experimental studies in infectious diseases and research in community medicine. Admission by permission of Department. (Fall and spring)

299–300 **Thesis Research** (3–3) — Staff

(Fall and spring)

301 **Epidemiology and Environmental Health** (2) — Staff

Lectures and seminars. Emphasis on means of organizing community to provide epidemiological solutions to health problems, developing an awareness of health resources and significant socioeconomic considerations in bringing total health to the community, showing importance of health

as related to individual citizens. World health problems. Prerequisite: Micr 201 or equivalent. (Spring) Staff

351 **Global Epidemiology** (1)

For medical students; open to graduate students by arrangement. Geographic pathology of disease and international aspects of disease prevention and control, including world demographic problems. (Fall) Hurley

352 **Seminar: Experimental Epidemiology** (2)

For medical students; open to graduate students by arrangement. Student participation in definitions, design, and methods for developing epidemiologic studies of diseases. Prerequisite: Epid 230 or permission of instructor. (Fall) Staff

353 **Military Preventive Medicine** (1)

Operational medicine, environmental and sanitation problems, epidemiologic diseases of military importance and their prevention and control. Medical aspects of aerospace and submarine medicine. (Fall) Lee and Staff

354 **Seminar: Human Ecology** (1)

Ecology—man within the framework of reference—physical and cultural; anthropology, geography, sociology, urban planning, public health, and public administration. (Fall) Jaffe, Millis

355 **Clinical Effects of Air Pollution** (1)

Identification, description, and discussion of major air pollutants; chemical structure and function of the agents; toxicological and clinicopathological effects observed in man. (Fall) Staff

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring) Staff

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Experimental Humanities*

Professor C.C. Mondale
Adjunct Assistant Professor R.S. French

FIRST GROUP

†26 **Environmental Issues** (3) Pederson, Schaefer

An interdisciplinary analysis of selected aspects of the population situation, pollution and human health, urban environmental problems, problems of economic growth and development, technology and public policy. (Spring)

* Administered by the Office of Program Development.
† Offered jointly by the Office of Program Development and the departments of Biological Sciences and Geography and Regional Science.

37 **Computer Technology and Social Issues: the Search for New Alternatives** (3) — Mondale and Interdisciplinary Team

An all-university course designed primarily for freshmen. Student team-study of selected social issues related to developing computer technology. Introduction to computer systems and to applications and long-range implications of the new technology. (Fall)

40 **Washington, D.C., Culture and Politics** (3) — French and Interdisciplinary Team

An all-university course designed primarily for freshmen. Major facets of metropolitan life, past and present, analyzed by faculty, students, and community leaders. (Spring)

51–52 **The Individual and the City** (3–3) — French, Scanlan, R. Wallace

(Replaces former Hum 51 Individuality in the Urban Community (3) and Hum 52 Urban Goals and Agents of Change (3))

Sophomore-level course. Hum 51: impact of urbanization on individuality as revealed in the arts and literature, and as analyzed in scientific studies of culture and personality. Hum 52: individual and/or group study of agencies of change, with special reference to Washington, D.C., area. Admission by permission of instructor. (Academic year)

ECOND GROUP

101–2 **Supervised Work-Study** (6–6) — Staff

Community-based projects supervised by appropriate faculty. Juniors and seniors admitted by permission of instructor. Prerequisite to Hum 102: Hum 101. (Hum 101 and 102—fall and spring)

194 **The Washington, D.C., Spanish-American Community** (3)

Examination of major problems confronting the Spanish-American population in Washington, D.C.

*196 **Urban Ecology Workshop** (4)

Legal, scientific, political, and ethical aspects of specific environmental issues in the Washington, D.C., metropolitan area.

198 **Conference on Policy Studies and the Humanities** (6 to 15) — Mondale and Interdisciplinary Team

Examination of specific contemporary policy issues in relation to alternative social goals. A new policy issue will be selected each year. Open only to graduate, law, and medical students, and undergraduate seniors by permission of instructor. (Spring)

ensic Science

essors T.P. Perros (*Chairman*), A.H. Desmond
emorial Lecturers I.W. Conrad, Briggs White

—

ered jointly by the Office of Program Development and the Department of Education. Hum 196 not have a laboratory session; therefore students receive a maximum of 4 semester hours of credit ll course. Educ 196 has a laboratory session on curricular materials for elementary and secondary teachers, therefore teachers receive 2 additional hours of credit for a total of 6 semester hours e course.

Associate Professorial Lecturer C.G. McWright
Assistant Professorial Lecturers M.S. Clark, T.F. Kelleher, Jr., E.H. Williams, J.L. Gormley

Master of Science in Forensic Science.—This interdisciplinary degree program may include course work from the biological and physical science departments of the Graduate School of Arts and Sciences, and from the School of Government and Business Administration and the National Law Center. The student will work closely with his advisers in setting up a program that meets his interests, needs, and background knowledge. The Department is also affiliated with the Armed Forces Institute of Pathology in a program of mutual exchange among students, courses, and facilities. For further information, contact the Department of Forensic Science.

Prerequisite: a Bachelor's degree with a major in mathematics or in the physical, biological, or engineering sciences; or an equivalent degree.

Required: the general requirements, 93–100. The program of study consists of 36 semester hours of approved graduate-level courses with or without a thesis (equivalent to 6 semester hours). The program of study must include the following courses: ForS 201, 202, 224, 225 or 226, 227 or 228; Mgt 218; and 6 semester hours of graduate-level courses selected, with the approval of the advisers, from the biological and physical sciences. The remaining semester hours of course work must be selected from approved courses in the areas of science, law, and management science; however, the student may elect courses from only two of the three areas. All candidates are required to pass a Master's Comprehensive Examination. If a candidate elects a thesis, the thesis work is directed by one of the participating departments in the Forensic Science program. There is no tool requirement.

Elective courses may be selected from the following: Anat 252, 256, 260, 265; Bioc 221–22; B Sc 104, 111, 115, 123, 124, 127, 129, 130, 138, 148, 164, 205, 265; Chem 111–12, 113–14, 122, 134, 219, 221, 222, 235–36; Mgt 201, 204, 231, 233–34, 236, 241, 243, 244, 247, 249, 251–52.

201 Forensic Science in Law Enforcement I: Serology, Microscopy, Mineralogy (3)

Principles in forensic serology; microscopic and optical analyses of human and animal reproductive cells, hairs, natural and synthetic fibers, and materials of a mineral nature. (Fall)

202 Forensic Science in Law Enforcement II: Instrumental Analysis (3)

Theories and principles of instrumental analysis, including emission spectrography, X-ray spectrography and diffractometry, infrared, and ultraviolet methods of identification and analysis. (Spring)

203 Forensic Science in Law Enforcement III: Examination of Questioned Documents (3)

Theory and principles of handwriting and handprinting, duplicating processes, paper manufacture, and fiber analysis; studies of paper and methods of examination of questioned documents. (Fall)

204 Forensic Science in Law Enforcement IV: Firearms and Tool-mark Identification (3)

Study of methods for identifying firearms, cartridge casings, tool marks, tire marks, and footprints of significance in criminal procedures. (Spring)

224 **Introductory Criminal Procedure, Evidence and Legal Methods** (3) — Staff

Principles of criminal procedure, preparation and presentation of evidence, examination of witnesses, and the methods of legal research. (Fall)

225 **Advanced Criminal Evidence** (3) — Staff
(Formerly ForS 205)

Study of procedural rules affecting the collection, accessibility, and use of physical evidence with emphasis on court opinions defining the rules of search and seizure. Prerequisite: ForS 224. (Spring)

*226 **The Crime Lab, the Forensic Scientist, and the Criminal Lawyer** (3) — Staff
(Formerly ForS 206 The Scientist as an Expert Witness)

Same as Law 437(2). Qualifications and preparation of an expert witness and the relationships and responsibilities of the expert in court in criminal and civil cases. Prerequisite: ForS 224.

*227 **Advanced Criminal Procedure** (3) — Staff
(Formerly ForS 207)

Same as Law 344 (2). Decision to arrest, prosecutive discretion, bail, the preliminary hearing, right to a speedy trial, discovery, plea bargaining, publicity, post-conviction procedures. Prerequisite: ForS 224. (Fall)

*228 **Administration of Criminal Justice** (3) — Staff
(Formerly ForS 208)

Same as Law 472 (2). Consideration and analysis of selected advanced problems in the administration of criminal justice. Emphasis will be placed on the role and professional responsibilities of prosecutor and defense counsel and on development trends in the law. Prerequisite: ForS 224. (Fall and spring)

*229 **The Police and the Community** (3) — Staff
(Formerly ForS 209)

Same as Law 477 (2). Problems and potential of contemporary urban law enforcement: the role and perspective of the police officer. Prerequisite: ForS 224. (Spring)

*230 **Forensic Medicine** (3) — Staff
(Formerly ForS 210)

Same as Law 390 (2). Survey of interprofessional relations between physicians and lawyers in the office, hospital, and courtroom; incidental attention to laboratories, legislatures, and administrative agencies. Prerequisite: ForS 224. (Fall)

*231 **Law and Criminology I: Search for the Causes of Criminal Behavior** (3) — Staff
(Formerly ForS 211)

Same as Law 475 (2). Role which knowledge of crime causation may play in assessing devices to control deviant behavior: factors related to criminal behavior; current casual theories. Prerequisite: ForS 224. (Fall)

*Students registering for ForS 226, 227, 228, 229, 230, or 231 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour.

*232 **Law and Criminology II: Society's Responses to the Criminal Offender** (3) Staff
(Formerly ForS 212)
Same as Law 476 (2). Study of punitive, mechanical, and correctional approaches to offenders. Emphasis on changing responses to criminal and delinquent behavior, and research on effectiveness. Prerequisite: ForS 224. (Spring) Staff

*233 **Post-conviction Dispositions—Dynamics of the Law of Criminal Corrections** (3)
(Formerly ForS 213)
Same as Law 478 (2). Study of statutes, practice, problems, and potential of alternatives facing a defendant: mental fitness to proceed to trial, pre- bation, sentencing, parole, prisoner rights. Prerequisite: ForS 224. (Fall and spring) Staff

254 **Seminar: Recent Developments in Forensic Science** (2)
Studies of current advances and problems in law and science relating to forensic science. Staff

295 **Research** (arr.)
Open to qualified Master's degree students. Research on problems approved by the departmental advisers. May be repeated for credit. Staff

299–300 **Thesis Research** (3-3)
(Academic year)

French

See "Romance Languages and Literatures."

Genetics—Graduate Study

COMMITTEE ON GENETICS

S.O. Schiff (*Chairman*), W.F. Anderson, L.F. Arias-Bernal, V.H. Cohn, Jr., Rosalie De Giovanni-Donnelly, C.B. Jacobson, W.M. Leach, M.S. Legator, C.D. Lytle, C.R. Merril, W.G. Nash, I.R. Telford

The Graduate School of Arts and Sciences offers an interdepartmental program leading to the degrees of Master of Science and Doctor of Philosophy in the field of Genetics. This program is directed by a Committee whose members are drawn from the departments of Anatomy, Biochemistry, Biological Sciences, Child Health and Development, Microbiology, Obstetrics and Gynecology, and Pharmacology; and from three government agencies—the Bureau of Radiological Health, the Environmental Protection Agency, and the National Institute of Mental Health.

A baccalaureate degree is required for admission to the degree program. The

* Students registering for ForS 232 or 233 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour.

dergraduate program must have included the following: 8 semester hours each in ology, inorganic chemistry, organic chemistry, and physics; and 6 semester hours English composition and literature. While not required for admission, courses in bryology, histology, genetics, and mathematics are strongly recommended.

Master of Science in the field of Genetics.—Required: the general requirements, es 93–100. The 30 semester hours required in this program must include Gnet 1–2 and Gnet 299–300. The remaining 20 semester hours of course work are to elected, with the approval of the Committee on Genetics, from the departmental ses listed below.

Doctor of Philosophy in the field of Genetics.—Required: the general requirements, pages 93–97, 100–102. The program of study must include Gnet 301–2, 8 to 10 mester hours of biochemistry, 8 to 10 semester hours of cell biology, 10 to 12 mester hours of genetics, and 2 or 3 semester hours of statistics. These courses y be selected from the departmental listings on pages 291–93.

NETICS

RD GROUP

201–2 **Advanced Problems in Genetics** (2–2) **Staff**

Individual study with each member of the Committee on Genetics. Required of all Master's degree candidates in the field of Genetics. (Academic year)

295 **Research** (arr.) **Staff**

Open to qualified Master's degree students. Research on problems approved by the Committee on Genetics. May be repeated for credit. (Fall and spring)

9–300 **Thesis Research** (3–3) **Staff**

(Academic year)

RTH GROUP

301–2 **Advanced Problems in Genetics** (2–2) **Staff**

Individual study with each member of the Committee on Genetics. Required of all students preparing for the Doctor of Philosophy general examination whose field of study is Genetics. (Academic year)

398 **Advanced Reading and Research** (arr.) **Staff**

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr).

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

ATOMY

203 *Human Embryology* (1)
256 *Human Genetics* (1)
260 *Electron Microscopy in Cellular Biology—Lecture* (1)
261 *Electron Microscopy in Cellular Biology—Laboratory* (2)

BIOCHEMISTRY

221–22 *General Biochemistry* (4–5)
224 *Biochemistry of Enzymes* (1)
227 *Biochemistry Seminar* (1)
258 *Inherited Metabolic Diseases* (1)
266 *Biochemical Genetics* (1)

BIOLOGICAL SCIENCES

BIOLOGY

108 *Organic Evolution* (3)
115 *Cytology* (4)
118 *Advanced Cytology* (3)
123 *Cell Biochemistry* (3)
124 *Cell Biochemistry Laboratory* (1)
127 *Genetics* (4)
138 *Advanced Genetics* (3)
167 *Radiation Biology* (3)
206 *Seminar: Radiation Biology* (3)
207 *Seminar: Origin of Life* (3)
227 *Seminar: Genetics* (3)

ZOOLOGY

145 *Introduction to Vertebrate Embryology* (3)

EPIDEMIOLOGY AND ENVIRONMENTAL HEALTH

230 *Biostatistics* (2 or 4)

MICROBIOLOGY

258 *Microbial Genetics* (2)

OBSTETRICS AND GYNECOLOGY*

391 *Cytogenetics* (1)
392 *Reproductive Genetics* (1)
395 *Gametogenesis* (1)
399 *Medical Genetics* (1)

PHARMACOLOGY

256 *Molecular Pharmacology* (2)

PHYSIOLOGY

201 *Physiology* (8)
273 *Investigative Electron Microscopy* (3)

* See the *School of Medicine* catalogue.

TATISTICS

91 *Principles of Statistical Methods* (3)
117 *Analysis of Variance* (3)

eography and Regional Science

ociate Professor Marvin Gordon (*Chairman*)
tant Professors Subramaniam Moryadas, J.C. Lowe, E.O. Pederson

Bachelor of Arts with a major in Geography (Departmental).—The following re-ements must be fulfilled:
1. The general requirements as stated on pages 78, 83–88.
2. Required courses in the major—24 semester hours of second-group Geography Regional Science courses, to be chosen in consultation with a Departmental ser.

Master of Arts in the field of Geography.—Prerequisite: a Bachelor of Arts degree a major in Geography from this University, or an equivalent degree.
Required: the general requirements, pages 93–100. The minimum requirement con- of 30 semester hours of approved course work including a thesis; with the ap- of the Department, a student may elect a program of study without a A Master's Comprehensive Examination in three fields is required. Candi- must fulfill the tool requirement by either passing a reading knowledge mination in one foreign language or satisfactorily completing the tool require- in Statistics.

Bachelor of Arts in Education with a teaching field in Geography.—Prerequisite: Education curriculum, pages 80–81.
Required: the Geography option and the professional courses listed on pages 119.

Master of Arts in Education with a field in Elementary or Secondary Education ization in Geography).—Prerequisite: a Bachelor's degree with sufficient con- ation in Geography to permit successful pursuit of graduate study in the De- ment of Geography and Regional Science. Candidates must be accepted by both School of Education and the Department of Geography and Regional Science.
equired: the general requirements, pages 122-25, including 15 semester hours of duate courses in Geography.

IRST GROUP

*26 **Environmental Issues** (3) **Pederson, Schiff**

An interdisciplinary analysis of selected aspects of the population question, pollution and human health, urban environmental problems, issues of economic growth and development, technology and public policy. (Spring)

51 **Introduction to Geography** (3) **Staff**

General survey of the various systematic, physical, and human fields of geography which play a role in the analysis and interpretation of man-environment relationships in both spatial and ecological contexts. (Fall and spring)

ered jointly by the Office of Program Development and the departments of Biological ces and Geography and Regional Science.

52 **World Regional Patterns** (3) Pederson

Emphasis on spatial aspects of man's activities within a world regional framework. (Spring)

SECOND GROUP

103 **Cartography and Graphics** (3) Staff

Principles of cartography; emphasis on design and presentation of spatial data. Map projections, field surveying, use of air photographs, map interpretation, problems in thematic mapping. Laboratory fee, $15.

104 **Special Techniques in Cartography** (3) Staff

Descriptive and statistical techniques applied to spatial problems. Consideration of measures of central tendency, sampling, shape, nearest neighbor analysis, quadrat analysis, computer graphics. Laboratory fee, $15.

125 **Transportation Geography** (3) Lowe

Consideration of the spatial aspects of interaction, diffusion, and information transfer, including nodal activity and hierarchies, network geometry, gravity models, and diffusion processes. (Fall)

126 **Economic Geography** (3) Morysis

Consideration of theories and hypotheses concerning the location of economic activities: services, manufacturing, and agricultural production. Exercises in computer-oriented locational analysis. (Spring)

127 **Population and Settlement** (3) Gorse

Patterns of world population; factors contributing to population pressures, growth, and migrations. Staff

132 **Resources and Environment** (3)

Analysis of the spatial pattern of resources and the problems created by man's utilization of unevenly distributed resources. (Fall) Morysis

133 **Geography of Poverty and Hunger** (3)

Consideration of the locational aspects and correlates of poverty and hunger; rural and urban poverty regions; regional food budgets and taboos; programs concerned with the elimination of poverty and hunger. (Fall) Morysis

134 **Location of Industry** (3) Morysis

Geographical distribution of manufacturing industries in light of location theory and behavioral factors. Methods of selecting optional locations for new plants. Pedesis

140 **Urban Geography** (3)

Analysis of the internal spatial structure of cities; emphasis on explaining patterns of location within the city. (Spring) Pedesis

141 **Urban Settlement** (3)

Distribution of urbanization on the surface of the earth: processes which lead to urbanization; theories which can be used to analyze the location of cities. (Fall) Lowe

142 **Urban Environments and Systems** (3)

Consideration of the interrelationships among (1) urban physical env

ments, (2) urban service systems, (3) urban social environments, and (4) behavioral aspects of urban life. (Spring)

143 **Human Geography of the Washington, D.C., Area** (3) Pederson

The Washington, D.C., area as a laboratory for examination of basic problems in human geography. Field observations. (Spring)

144 **Environmental Adaptation** (3) Lowe

Consideration of the man-environment relationship; emphasis on bioclimatological responses, disease ecology, nutritional demands, land capabilities, artificial environments, and environmental perception. (Fall)

145 **Cultural Geography** (3) Staff

Analysis of the relationships between culture and environment; emphasis on spatial and ecological considerations.

146 **Political Geography** (3) Moryadas

Analysis of the interrelationships between the political community and the human and physical environment. (Fall and spring)

161 **Latin America** (3) Gordon

Examination of spatial characteristics of physical and cultural phenomena in Middle and South America. (Fall)

189–90 **Readings in Geography** (arr.) Staff

(Academic year)

GROUP

205 **Introduction to Regional Science I** (3) Moryadas

Introduction to recent developments in spatial analysis including the fitting of probability functions to areal data; multivariate analysis; models optimality of numerical methods of regional delimitation. (Spring)

206 **Introduction to Regional Science II** (3) Moryadas

Study of classical location theory, including the works of Weber, Losch, Hoover, and Isard. Departures from classical theory, especially behavioral approaches to studying the location problem. (Fall)

221 **Seminar: Cultural Geography** (3) Pederson

Study of the noneconomic processes which affect the location of human activity. Topics to be discussed are environmental perception and evaluation, social definitions of space, and diffusion of innovations.

224 **Seminar: Political Geography** (3) Gordon

Study of the spatial relationships between the political community and environment.

225 **Seminar: Transportation Geography** (3) Lowe

Analysis of human spatial interaction; emphasis on networks, graph theory, gravity, interaction and potential models, migration models and diffusion processes.

243 **Seminar: Urban Geography** (3) Lowe

Functional processes affecting the evolving morphology and internal spa-

tial patterns of urban phenomena; emphasis on economic factors, behavioral considerations, and impact of time. (Spring)

Pederson

244 **Seminar: Urban Systems** (3)

Analysis of the basic concepts of urban hinterland, urban hierarchies, urban economic base, and functional typologies with a view to evaluating the significance of central place theory. (Fall)

Gordon

261 **Seminar: Geography of Latin America** (3)

Analysis of man-land relationships in Latin America. (Spring)

Baclawski

265 **Seminar: Geography of the Soviet Union** (3)

Physical features, economic geography, natural and energy resources, industries, transportation, agriculture, population trends; emphasis on population patterns along borderlands, especially Sino-Soviet border. (Spring)

True

266 **Seminar: Geography of China** (3)

Physical and economic geography; emerging industries, energy resources, transportation system. Emphasis on population distribution and growth, regional geography of selected areas. (Fall)

Gordon

287 **Seminar: Problems in Latin American Civilization** (3)

Interdisciplinary seminar partially guided by a specialist within the methodology of his chosen discipline; each student writes a report on some aspect of a selected key theme. Admission by permission of instructor. (Spring)

Moryadas

290 **Seminar: Selected Topics** (3)

Geographical distribution of voting behavior at macro and micro scales. Statistical analysis of recent election returns from the United States and selected non-Western nations. Topic changes each year: may be repeated for credit. (Topic: Electoral Geography—spring)

Staff

295 **Research** (arr.)

May be repeated once for credit. (Fall and spring)

Staff

299–300 **Thesis Research** (3–3)

(Fall and spring)

Geology

Professors Geza Teleki (*Chairman*), G.V. Carroll, Charles Milton (*Research*), F.R. Siegel

Adjunct Professors J.W. Pierce, E.G. Kauffman, I.G. Sohn

Professorial Lecturers Nicholas Hotton, Daniel Appleman, P.M. Kier, H. Evans, Jr.

Associate Professors A.G. Coates, R.C. Lindholm, J.F. Lewis, P.J. Wasilewski (*Research*)

Associate Professorial Lecturers W.E. Maloney, M.A. Buzas, J.E. Hazel, Isaac Zietz

Assistant Professorial Lecturers F.J. Collier, T.L. Hughes, E.T. Miller

Bachelor of Arts or *Bachelor of Science with a major in Geology (Departmental).*—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88.
2. Prerequisite course—Geol 21-22.
3. Required courses in related areas—(a) Chem 11-12; (b) Math 30 (for the degree of Bachelor of Arts) or Math 30 and 31 (for the degree of Bachelor of Science); (c) Stat 91; and (d) 6 or 8 semester hours in either Biological Sciences or Physics (for the degree of Bachelor of Arts) or 6 or 8 semester hours in Biological Sciences *and* 6 or 8 semester hours in Physics (for the degree of Bachelor of Science).
4. Required courses in the major—Geol 111–12, 115, 117, 122, 151–52 for both the degree of Bachelor of Arts and Bachelor of Science; Geol 101, 172 for the Bachelor of Science degree only.

Master of Arts or *Master of Science in the field of Geology.*—Prerequisite: the degree of Bachelor of Arts or Bachelor of Science, respectively, with a major in geology from this University, or an equivalent degree.

Required: the general requirements, pages 93–100. Master of Science degree candidates must include in their program of study Geol 141, 163, 205, and 206. Geol 299–300 *Thesis Research* is required for both degrees. Candidates must pass a Master's Comprehensive Examination before submitting their thesis work. A reading knowledge examination in French, German, Russian, or Spanish (with permission of Department), must be passed before beginning the thesis work. With the permission of the Department, candidates in the Master of Science program may substitute another approved tool subject in lieu of the foreign language requirement.

Master of Science in the field of Geochemistry (an interdepartmental degree offered by the departments of Geology and Chemistry).—Prerequisite: a Bachelor's degree with a major in Geology or in Chemistry from this University, or an equivalent degree.

Required: the general requirements, pages 93–100, including Chem 111, 112; Geol 241, 249; Geol 246 or Chem 213; and Geol 299–300. The Master's Comprehensive Examination must be taken before registration for the second half of the thesis work. A reading knowledge examination in a foreign language, approved by the Department of Geology or Chemistry, must be passed before beginning the thesis work.

Doctor of Philosophy in the field of Geology.—Required: the general requirements, pages 93–97, 100–102, including passing a reading knowledge examination in an approved foreign language plus the satisfactory completion of Stat 49; and the satisfactory completion of the General Examination in three fields, one of which must be Petrology, Stratigraphy, or Structural Geology.

Research fields: Geomorphology, Mineralogy, Paleontology, Petrology, Sedimentation, Stratigraphy, and Structural Geology.

Doctor of Philosophy in the field of Geochemistry (an interdepartmental field offered by the departments of Geology and Chemistry).—Required: the general requirements, pages 93–97, 100–102, including passing a reading knowledge examination in an approved foreign language plus the satisfactory completion of Stat 49; the satisfactory completion of the General Examination in four fields, including chemistry and chemistry.

Bachelor of Arts in Education with a teaching field in Earth Science.—Prerequisite: the Education curriculum, pages 80–81.

Required: the Earth Science option and the professional courses listed on pages 118, 119.

T GROUP

1–2 **Introductory Geology** (3–3) Staff

Lecture (2 hours), laboratory (2 hours), optional field trips. Survey

covering the principles of geology; emphasis on man's effect on the e
vironment. Laboratory fee, $12 a semester. (Academic year)

5 **Environmental Geology** (3)

The relation of man and society to natural environment; populatio
evolution and resources; economic, legal, and political aspects. (Fa

14 **Field Petrology** (3)

(Formerly General Petrology)

Lecture (2 hours), laboratory and field (3 hours). Macroscopic study
rocks. Prerequisite: Geol 1–2 or 22 (Geol 22 may be taken concurrent
Laboratory fee, $12. (Fall)

21–22 **Physical and Evolutionary Geology** (3–3) Lindholm, Cou

Lecture and laboratory (5 hours). Principles of geology as a base f
further study in geology and related sciences. Laboratory fee, $12
semester. (Geol 21—spring; Geol 22—fall)

SECOND GROUP

101 **History of Geological Sciences** (3)

Development of scientific thought; history of geological and relat
sciences. (1973–74 and alternate years)

111–12 **Mineralogy** (4–4)

Lectures and laboratory. Geol 111: morphological and optical crystall
raphy. Geol 112: paragenetic and systematic mineralogy. Admission
permission of instructor. Laboratory fee, $12 a semester. (Acade
year)

113 **Crystallography** (3)

Point-group and space-group theory, fundamentals of crystal struct
X-ray diffraction theory and application. Prerequisite: Math 31. La
tory fee, $15. (Spring)

115 **Laboratory in Petrography** (2)

Specialized training in petrography. Admission by permission of inst
tor. Prerequisite or concurrent registration: Geol 117. May be repe
for credit. Laboratory fee, $12. (Fall and spring)

117 **Petrology** (2)

Introduction to silicate phase systems; physics and chemistry of c
and magmatic processes; volcanic processes and products. Prereq
Geol 21, 111–12; Phys 1 or equivalent. Required: concurrent regist
in Geol 115.

122 **Structural Geology** (3)

Lectures and field trips. Interpretation of geologic formations b
of their structures; emphasis on applications to geologic field work
requisite: Geol 22, or Geol 2 and 14. Laboratory fee, $8. (Spr

125 **Marine Geology** (3)

Lecture and map work. Principles of oceanography and submarine
ogy; topography, crustal structure, sedimentary processes, and
environment. Prerequisite: Geol 1–2. (1973–74 and alternate

128 **Geomorphology** (3) Teleki

Lecture (2 hours), laboratory and field trips as arranged. Nature and evolution of earth forms. Prerequisite: Geol 21–22, or permission of instructor. (Spring)

136 **Engineering Geology** (3) Staff

For students in the School of Engineering and Applied Science. Geological principles and processes and their application to civil and mechanical engineering. Prerequisite: Math 31, Phys 2; or permission of instructor. (Spring)

141 **Introductory Geochemistry** (3) Siegel

Lecture (2 hours), laboratory as arranged. Principles and theories on the abundance, relationships, and distribution of the elements in various rock and mineral species. Prerequisite or concurrent registration: Geol 117 or equivalent; Chem 11–12; Math 30; Phys 1, 2; or permission of instructor. Laboratory fee, $12. (Fall)

147 **Chemical Geology in the Earth and Ocean Sciences** (3) Siegel

Introduction to geochemical and chemical principles involved in geological systems and their application to contemporary problems in oceanology, pollution, and mineral exploration. Laboratory fee, $12.

151–52 **Invertebrate Paleontology** (3–3) Coates

Lecture and laboratory (5 hours), field trips as arranged. A systematic treatment of the invertebrate fossil groups, emphasis on the macroinvertebrates. Prerequisite: Geol 1–2. Laboratory fee, $12 a semester. (Academic year)

154 **Vertebrate Paleontology** (3) Hotton

Lecture (2 hours), laboratory or field as arranged. General features of vertebrate morphology and evolution; problems of paleoecology and adaptation. (Fall)

157 **Methods of Systematic Paleozoology** (3) Sohn

Lecture and discussion. Introduction to bibliographic source and rules of zoological nomenclature. Presentation of data, including synonymies and keys. Prerequisite: Geol 151–52 or B Sc 101–2. (1973–74 and alternate years)

158 **Micropaleontology** (3) Sohn

Lecture (2 hours), laboratory as arranged. Identification with binocular microscope of important microfossil groups. Micropaleontological techniques. Prerequisite: Geol 157 or permission of instructor. Laboratory fee, $12. (Spring)

163 **Sedimentation** (4) Lindholm

Lecture (2 hours), laboratory (4 hours), field trips as arranged. Principles of sedimentation, analysis and interpretation of sedimentary processes and environment, laboratory experiments in the properties of sedimentary particles. Prerequisite: Geol 111 or permission of instructor. Laboratory fee, $15. (Fall)

172 **Regional Geology** (3) Staff

Lecture, research, and discussion of major geologic or physiographic regions. Prerequisite: Geol 122. (Spring)

181 **General Oceanography** (3) Malone

Chemical and physical properties of sea water, movements of water masses, meteorological interrelations, ecology of marine plants and animals. Prerequisite: Math 33 or equivalent, or permission of instructor. (Spring) Ziet

187 **Geophysics for Geologists I** (3)

Basic geophysics to assist the geologist in detailed and regional mapping and in solving fundamental geologic problems. Emphasis on magnetic, gravimetric, and radioactive methods. Prerequisite: Math 31; Phys 1, 2. (1972–73 and alternate years—spring) Ziet

188 **Geophysics for Geologists II** (3)

Basic geophysics to assist the geologist in mapping and in solving geologic problems. Emphasis on seismic, electric, and electromagnetic methods. Prerequisite: Math 31; Phys 1, 2. Staff

195 **Field Work** (4)

Weekend field trips. Surveying, geological mapping, and specific field work methods. (Spring) Staff

199 **Undergraduate Research** (arr.)

Problems approved by the staff. May be repeated once for credit. (Fall and spring)

THIRD GROUP Staff

205 **Seminar in Geology** (3) (Fall and spring) Staff

Special topics each semester. May be repeated for credit.

212 **Crystal Chemistry** (3) Appleman

(1973–74 and alternate years)

214 **X-ray Mineralogy** (3) Lindsley

Problems in X-ray mineralogy, crystal chemistry of rock-forming minerals. Laboratory fee, $15. (1973–74 and alternate years)

216 **Sedimentary Petrography** (3)

Identification, classification, and interpretation of common sedimentary rocks by means of the petrographic microscope. Prerequisite: Geol 163; or permission of instructor. Laboratory fee, $15. (Spring) Le

219 **Petrogenesis I** (3) (Fa Le

The origin of selected igneous and metamorphic rock types.

220 **Petrogenesis II** (3) Le

224 **Advanced Structural Geology** (3)

Methods of study and the hypotheses of the genesis of structurally complex rock. Problems of orogeny. Prerequisite: Geol 122 or permission of instructor. (Fall) Staff

241 **Geochemistry** (3)

Chemical composition and physical properties of sea water, chemical composition and alterations of marine sediments, thermodynamics and chemical activity in oceans. Methods of analysis and problems of

uring. Prerequisite: Math 32, Phys 51–52; or permission of instructor. Recommended: Chem 22. Laboratory fee, $18. (1972-73 and alternate years)

242 **Experimental Geochemistry** (3) Staff

Recent advances in geochemistry, instrumental methods and their application. Special topics. Does not repeat itself and may be repeated for credit. Prerequisite: Chem 111–12. (Spring)

243 **Geochemical Prospecting** (3) Siegel

Application of geochemical principles and analyses to the detection of hidden ore deposits. Field trips as arranged. Laboratory fee, $15. (Spring)

246 **Physical Chemistry in Relation to Geologic Problems** (3) Huebner

Application of thermodynamics to phase equilibria studies of minerals and rocks.

249 **Seminar: Geochemistry** (2) Siegel

Independent topics each semester; may be repeated for credit. (Fall or spring)

253 **Bioassociational Studies in Paleontology** (3) Hazel

(Formerly Applied Paleontology)

Analysis and interpretation of the distribution of marine animals with emphasis on biogeographic, paleoclimatologic, and biostratigraphic inferences and multiplate techniques. (Fall)

254 **Interpretive Paleontology** (3) Kauffman and Staff

Comparative study of form and function in fossil and recent organisms as related to the interpretation of evolution. Prerequisite: Geol 151–52. (Spring)

255 **Population Paleoecology** (3) Buzas

Characteristics of populations applicable to the fossil record. Subject matter includes ecosystem concept, habitat, Hutchinsonian niche, life-death, size frequency distributions, competitive exclusion principle, spatial distributions, relative abundance and diversity, quantification of community biofacies. Prerequisite: Geol 151–52, Stat 91; or permission of instructor. (1973–74 and alternate years)

263 **Advanced Sedimentology** (arr.) Pierce

Prerequisite: Geol 163. Laboratory fee, $15. (Spring)

266 **Stratigraphy** (3) Coates, Kauffman

(Formerly Geol 166 Stratigraphy (4))

Physical and geological stratigraphy. (Fall)

282 **Oceanography** (3) Maloney

(Formerly Geol 182)

Boundary processes between oceans and the atmosphere. Principles of dynamics and their application to motion of variables; acoustics of water masses. Prerequisite: Geol 181. (Fall)

295 **Research** (arr.) Staff

Research on problems approved by the Staff. Open to qualified students with advanced training. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit
(Fall and spring)

Germanic Languages and Literatures

Professor J.C. King
Associate Professors Klaus Thoenelt, Carl Steiner (*Chairman*)
Assistant Professorial Lecturers Margaret Guenther, Lucie Kressley
Lecturer Blanche Gardner

Bachelor of Arts with a major in Germanic Languages and Literatures (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88.
2. Prerequisite courses—Germ 1–2, 3–4, 9–10, 51–52; or equivalent.
3. Required courses in other areas—6 semester hours of history, and 6 semester hours in one of the following subjects: art history, music history, or philosophy.
4. Requirements for the major—a minimum of 24 semester hours in German courses above the first group, including Germ 179–80; reasonable proficiency in speaking, reading, and writing German.

Master of Arts in the field of Germanic Languages and Literatures.—Prerequisite: a Bachelor of Arts degree with a major in Germanic Languages and Literatures from this University, or an equivalent degree.

Required: the general requirements, pages 93–100, including a reading knowledge of French. The program of study consists of (1) 24 semester hours of approved course work plus a thesis (equivalent to 6 semester hours) in the field of German literature or linguistics or (2) 36 semester hours of approved course work without a thesis.

Bachelor of Arts in Education with a teaching field in German.—Prerequisite: the Education curriculum, pages 80–81.

Required: the German option and the professional courses listed on pages 114.

The Department of Germanic Languages and Literatures, through the Consortium of Universities of the Washington Metropolitan Area, Inc., cooperates in a program leading to the degree of Doctor of Philosophy at Georgetown University.

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination assignment is made to the appropriate course.

FIRST GROUP

1–2 **First-year German** (3–3)
A year course: credit toward a degree at this University given on completion

tion of Germ 2. Essentials of German grammar; reading of easy prose. Aural-oral practice in language laboratory. Laboratory fee, $17.50 a semester. (Germ 1 and 2—fall and spring)

*3–4 **Second-year German** (3–3) **Staff**

A year course: credit toward a degree at this University given on completion of Germ 4. Selections from modern German prose; continuation and review of grammar. Aural-oral practice in language laboratory. Prerequisite: Germ 1–2 or equivalent. Laboratory fee, $17.50 a semester. (Germ 3 and 4—fall and spring)

*9–10 **German Conversation and Composition** (3–3) **Staff**

(Academic year)

47 **Beginning German for Reading Examination Candidates** (0) **Staff**

Specifically for graduate students with little or no German who are preparing for reading examinations. No academic credit. Tuition fee, $240. (Fall and spring)

49 **German Readings for Nonmajor Students** (3) **Staff**

Primarily for graduate students preparing for reading examinations, undergraduates admitted. No academic credit for graduate students. Prerequisite: Germ 4 or 47, or equivalent. (Fall and spring)

51–52 **Introduction to German Literature** (3–3) **Staff**

Lecture, recitation, and discussion in English. Selected readings in German literature from the earliest periods to the present. (Academic year)

SECOND GROUP

103–4 **"Faust" and "Wilhelm Meister"** (3–3) **Thoenelt**

Analysis of two aspects of German civilization: lecture and discussion in English. (1972–73 and alternate years—academic year)

131–32 **18th Century German Literature** (3–3) **Thoenelt**

Enlightenment, Storm and Stress, Classicism. (1973–74 and alternate years—academic year)

141–42 **19th Century German Literature** (3–3) **Steiner**

Romanticism, Biedermeier, Young Germany, Realism. (1972–73 and alternate years—academic year)

151–52 **20th Century German Literature** (3–3) **Steiner**

The age of Nietzsche, Naturalism, Impressionism, Expressionism; Kafka, Thomas Mann, Hesse; émigré literature, contemporary drama; authors of Gruppe 47. (1973–74 and alternate years—academic year)

161–62 **Studies in Modern German Literature** (3–3) **Steiner**

Readings of representative writers of modern German prose; lecture and discussion in English. (1972–73 and alternate years—academic year)

*With permission of instructor, Germ 9-10 may be taken concurrently with Germ 4.

179–80 **Advanced Conversation and Composition** (3–3) Thoenelt
For undergraduate and graduate majors. (Academic year)

THIRD GROUP King

201–2 **Middle High German** (3–3)
(1973–74 and alternate years—academic year) King

209–10 **Old High German** (3–3)
(1972–73 and alternate years—academic year) King

211–12 **History of the German Language** (3–3)
(1972–73 and alternate years—academic year) Allen

213–14 **Old Norse** (3–3)
(1973–74 and alternate years—academic year) King, Allen

225–26 **Seminar: Linguistics** (3–3)
Bibliography, methodology, readings, and research problems. King

227–28 **Sanskrit—Introduction to Indo-European Linguistics** (3–3)
Old Indic language and literature. (1973–74 and alternate years—academic year) Thoenelt

231–32 **German Classicism** (3–3)
Advanced study and critique of the classical literature of the Goethe era. Prerequisite: Germ 131–32 or equivalent. (1972–73 and alternate years—academic year) Steiner

251–52 **Seminar: Studies in 20th Century German Emigré Literature** (3–3)
Special projects in fiction, drama, poetry, and criticism. (1972–73 and alternate years—academic year) Steiner

271–72 **Seminar: German Realism** (3–3)
Analysis of authors, works, genres, and literary trends. (19[illegible] and alternate years—academic year) Staff

299–300 **Thesis Research** (3–3)
(Fall and spring)

Greek

See "Classics."

Health Care Administration

Professors Leon Gintzig (*Chairman*), W.A. Hamrick, Harriet Felton (*Research*)
Professorial Lecturer M.J. Taves

sociate Professors Lloyd Bartholomew, R.R. Bonato (*Research*)
sociate Clinical Professor Nina Woodside
sociate Professorial Lecturers G.E. Morris, W.A. Parker
sistant Professors P.N. Reeves, W.H. Guy (*Research*), James McKeon (*Research*), L.W. Katz
sistant Professorial Lecturers H.R. Wertlieb, Raleigh Cline, Jessie Gertman, Sami Khoury
structors Patricia Cleary (*Research*), Richard Switalski (*Research*)

Programs of study in Health Care Administration leading to the degrees of *Master Arts in Health Care Administration, Master of Business Administration, Master Public Administration, Post-Master's Graduate Certificate in Health Care Administration, Doctor of Business Administration,* and *Doctor of Public Administration* e offered by the School of Government and Business Administration (see pages 1–60).

ECOND GROUP

153–54 **Survey of Health Care Organization and Procedures** (3–3) Parker

Introduction to the history, concepts, and activities of health care systems in this country. Emphasis on organization and procedures. Prerequisite to HCA 154: HCA 153 or permission of instructor. Not open to Master's degree candidates in Health Care Administration. (Academic year)

HIRD GROUP

202 **Introduction to Health Care** (3) Woodside, Khoury

Lecture and discussion (2 hours), laboratory (2 hours). Survey of organization, functions, trends, and issues among governmental, nongovernmental, voluntary sectors; survey of major diseases by organ systems and their impact on administration and planning; medical terminology. (Fall and spring)

203 **Health Care Organization and Management** (3) Hamrick, Parker

Lecture and discussion (2 hours), laboratory (2 hours). History and current character of institutional health care. Organizational functions and structure of various kinds of health care facilities. Prerequisite or concurrent registration: Mgt 201. (Fall and spring)

204 **Planning and Support Agencies and Associations** (3) Staff

Functions performed and special support techniques of hospital, medical, public health, nursing home, planning, educational, and similar associations.

205 **Hospital Management Procedures** (3) Parker, Hamrick

Lecture and discussion (2 hours), laboratory (2 hours). Departmental administration. Survey of hospital law; hospital forms, procedures, and systems; and hospital programs pertaining to disaster relief, safety, fire prevention. (Fall and spring)

206 **Case Studies in Health Care Administration** (3) Gintzig

Discussion (2 hours), laboratory (2 hours). General ideas about administration applied to practical cases. Emphasis on policy-making, planning, controlling, and organizing. Prerequisite: HCA 203 and Mgt 201. (Fall and spring)

207 **Management Analysis in Health Care Institutions** (3) Gintzig, Bartholomew

Lecture (2 hours), laboratory (2 hours). Basic investigation and problem-solving techniques, including various methods of collecting, analyzing, reporting, and using information that can be made available to administrators of hospitals and other medical care institutions. (Fall and spring)

209 **Health Care Economics and Financial Management** (3) Katz

Lecture (2 hours), laboratory (2 hours). Economic and financial analysis of the interactions between consumers and providers of health care, and public and private prepayment and insurance programs. Industry price structure and the long- and short-term capital requirements. (Fall and spring)

210 **Advanced Financial Management of Health Care Institutions** (3) Katz

Nature and interpretation of health care institution financial reports. Techniques of financial planning and control; operation of third-party reimbursement contracts; capital needs, planning, and acquisition; case studies, field research. Prerequisite: HCA 209. (Fall or spring)

212 **Health Project Planning** (3) Reeves, Woodside

Lecture (2 hours), laboratory (2 hours). Basic health planning methods and procedures for those students engaged in planning a specific facility or service. Prerequisite: HCA 202 and 203. (Fall and spring)

213 **Administration of Health Care Systems** (3) Gintzig

Comparative evaluation of various organizational patterns, functions, and trends in health care systems. Emphasis on the sources of such differences and significance of the systems to the health care of a nation. (Fall or spring)

214 **Health Systems Planning** (3) Reeves, Woodside

Advanced health planning for those students concerned with development of health systems; emphasis on the legal, political, social, and economic factors influencing health planning. Prerequisite: HCA 212. (Fall or spring)

215 **Practicum in Health Project Planning** (3) Reeves, Woodside

Supervised practical instruction in agencies doing comprehensive health planning; emphasis on basic investigation and problem-solving techniques, including various methods of collecting, analyzing, and reporting data. Prerequisite: HCA 212. (Fall or spring)

216 **Seminar: Health Systems Planning** (3) Reeves and Staff

An analysis of the effect of legal, political, social, and economic factors on the planning of health systems. This analysis will be conducted through the use of games and simulation models. Prerequisite: HCA 214 and 215. (Fall or spring)

250 **Mental Health Facilities and Resources** (3) Morris

Functional services, organization, administration, and management of mental health facilities—public and private mental hospitals, psychiatric units and services in general hospitals, community mental health centers, out-patient psychiatric clinics, and institutions for mental retardation.

260 **Seminar: Administration for Long-term Care** (3) Wertlieb

Comparative evaluation of characteristics of long-term care institutions, e.g., extended care, skilled nursing homes, homes and housing for the aged, etc.; relation of the purposes and functions of these institutions to the total health needs of the community. (Fall)

261 **Seminar: Administration for Long-term Care Institutions** (3) Wertlieb

Designed to improve the ability and effectiveness of health administrators through a foundation of knowledge and skills in health facility organization and management. Emphasis on range of services available in long-term care institutions.

265–66 **Readings in Long-term Care Administration** (3–3) Staff

Advanced studies in selected aspects of administration of long-term care facilities, including nursing homes, homes for the aged, and others. (Fall or spring)

267 **Social Gerontology for the Administrator** (3) Gertman, Taves

Special characteristics of the elderly with which administrators of long-term care facilities should be acquainted. (Fall and spring)

270 **Research in Health Care Administration** (3) Gintzig, Reeves

Field research. Primarily for doctoral candidates; open to other graduate students with consent of instructor. May be repeated for credit. (Fall or spring)

285–86 **Readings in Health Care Administration** (3–3) Staff

Supervised readings in some special areas or subdivisions of health care administration. Primarily for doctoral candidates; open to other students by arrangement. (Academic year)

287 **Seminar: Integration of Health Care Administration** (3) Staff

Primarily for doctoral candidates; open to other students by arrangement. May be repeated once for credit. (Fall)

288 **Seminar: Field Problem Studies in Health Care Administration** (3) Staff

Selected administrative issues and problems arising in health care facility situations. Primarily for doctoral students; open to other students by arrangement. May be repeated for credit. (Fall or spring)

293–94–95 **Residency I** (3–3–3) Bartholomew, Hamrick, Katz, Reeves

Twelve-month residency, beginning June 1 or July 1. Work experience under a qualified preceptor, periodic written progress reports, and a written major report.

296–97–98 **Residency II** (3–3–3) Gintzig

For selected students who take a second twelve-month residency; begins June 1 or July 1.

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Gintzig, Reeves

Limited to doctoral students preparing for the general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Gintzig, Bartholomew, Reeves

Limited to doctoral candidates. May be repeated for credit. (Fall and spring)

History

Professors Wood Gray, H.M. Merriman, R.H. Davison, R.B. Thompson, F.H. Michael, R.C. Haskett, R.P. Sharkey, H.M. Sachar, R.W. Kenny

Adjunct Professors R.P. Multhauf, Frederick Gutheim

Associate Professors C.J. Herber (*Chairman*), P.P. Hill, W.R. Johnson, Lois Schwoerer, Linda DePauw, Richard Thornton, Letitia Brown

Assistant Professors A.D. Andrews II, R.A. Hadley

Bachelor of Arts with a major in History (Field-of-Study).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirement for "meaningful initiation" into the Humanities and the Natural and Mathematical Sciences.)

2. Prerequisite courses—Hist 39–40 or 91–92, and 71–72; or equivalent.

3. Required courses in related areas—(a) either 12 semester hours of one introductory foreign language (French, German, Greek, Hebrew, Italian, Latin, Russian, or Spanish, or another approved language relevant to the student's program); or (b) 12 semester hours of Statistics (Stat 53 or 104; Stat 97; 105; and one course selected from Stat 131, 159, 188).

4. The passing of the History major examination in the senior year.

The major, and the major examination which attests it, is centered on the study of the Mediterranean rise, European development, and trans-Atlantic spread of Western Civilization, its interaction with other civilizations in a world context, and its continuing challenges to the present day. Under the guidance of an adviser the student will arrange his program in History to attain, insofar as possible, a balanced evaluation of (1) the rise of civilization in Europe from its Classical origins to the eve of the French Revolution; (2) the historic problems of modern Europe in the age of industry and ideology since 1789; (3) the political, social, economic, and cultural forces of the United States in their world setting since 1607; and (4) the nature and development of civilization in the principal areas outside of the North Atlantic community. Two 3-hour seminars, at least one of which must be research, are required as a part of each major's program (except Honors Program, see below). A required proseminar (Hist 199) is a means of integrating the student's understanding of the continuity of Western Civilization in its world context. A pamphlet relating to the major is available in the offices of the Dean of Columbian College of Arts and Sciences and the Department of History.

An Honors Program may be chosen by juniors with satisfactory scholastic records. Application to this Program must be made shortly before completion of the first semester of the junior year. Students accepted into the Program take a 3-hour research seminar in the second semester of the junior year and complete the research requirements for the history major by preparing the Senior Honors Thesis (Hist 191–92) in the final year of undergraduate study. A special proseminar section is offered for Honors Program students in the first semester of the senior year.

***Master of Arts in the Field of Classical Archeology, Classics, and History** (an interdepartmental degree program offered by the departments of Art, Classics, and History).*—See pages 211–12, 249.

Master of Arts in the field of History.—Prerequisite: A Bachelor's degree from an accredited college or university with a major in history, or an equivalent degree; high scholastic standing; and approval of the Department. Applicants from other institutions must present scores on the Graduate Record Examination with the Advanced Test in History and arrange for four persons, preferably former instructors, to send letters or reference forms to the Office of the Graduate School of Arts and Sciences.

Required: the general requirements, pages 93–100. Candidates must complete either (1) a minimum of 30 semester hours of second- and third-group courses, including History 299–300 *Thesis Research*, or (2) a minimum of 36 semester hours of second- and third-group courses, including at least two research seminars (6 semester hours). At least 6 semester hours of each candidate's program must be in third- or fourth-group History courses; a maximum of 6 may be in approved courses outside the Department of History. Master's candidates are responsible for arranging with instructors of second-group courses for extra work, in order to receive graduate credit for such courses. Each student works in two fields of history.

Doctor of Philosophy in the field of History.—Required: the general requirements, pages 93–97, 100–102, including the passing of a written examination in two foreign languages, normally French and German, and the satisfactory completion of the General Examination in four fields. Normally, each doctoral candidate will work in one major (or general) field of study and three special fields. The major fields include the following: Ancient History, Medieval Europe, Early Modern Europe, Modern Europe, United States, Latin America, Modern Near East, Modern Far East, Russia and East Europe. Special fields may vary from the topical (e.g., U.S. Social History, European Intellectual History, etc.) to the chronologically limited fields (e.g., American Colonial History, Tudor and Stuart England, etc.). A student may select one special field outside of the Department of History if it is relevant to his program.

Bachelor of Arts in Education with a teaching field in History.—Prerequisite: the Education curriculum, pages 80–81.

Required: the History option and the professional courses on pages 114–15, 119.

Doctor of Philosophy fields of study in International Relations combine work in Economics, History, and Political Science.

Departmental prerequisite: Hist 39–40 or 91–92 is prerequisite to courses 108 through 158 and 187 through 196; Hist 71–72, to courses 167 through 186; either Hist 39–40, 71–72, or 91–92, to courses 162 through 166. Prerequisite to Hist 105–6 is either Hist 39–40, 91–92, or a background in a science. Students may waive one or more of the prerequisite courses by passing a departmental waiver examination, by attaining scores of 600 or above on the College Entrance Examination Board Achievement tests, or by good performance on Advanced Placement Examinations.

FIRST GROUP

39–40 **European Civilization in Its World Context** (3–3) Staff

Hist 39: political, social, economic, and cultural history to early modern era. Hist 40: from early modern era to present. Students who receive credit for Hist 39–40 cannot receive credit for Hist 91–92. (Academic year)

71–72 **Introduction to American History** (3–3) Staff

Hist 71: political, social, economic, and cultural forces of the United

States in their world setting from 1492 to 1861. Hist 72: from 1861 to present. (Academic year)

Thompson

91–92 **World Civilizations** (3–3)

Hist 91: major civilizations of the world to 1500. Hist 92: Europocentric and world civilization since 1500. Students who receive credit for Hist 91–92 cannot receive credit for Hist 39–40. (Academic year)

SECOND GROUP

Multhauf

105–6 **History of Science** (3–3)

Hist 105: from ancient natural philosophy through the 17th century scientific revolution. Hist 106: scientific development from the 18th to the early 20th century. (Academic year)

Hadley

108 **The Ancient Near East and Egypt to 600 A.D.** (3)

Survey of Egyptian, Mesopotamian, Anatolian, West Semitic, and Iranian civilizations from the Neolithic period to the Islamic conquest. (Spring)

Hadley

109 **Early Aegean and Greek Civilizations to 200 B.C.** (3)

Neolithic background; Bronze age—Minoan, Helladic, and Mycenaean civilizations; classical Greek civilization to the eve of the Roman conquest.

Hadley

110 **The Roman World to 455 A.D.** (3)

Prehistoric Italy; rise and decline of the Roman Empire and Latin civilization; cultural, social, and political developments in the Greek world under Roman rule. (Fall)

Andrews

111–12 **Medieval History** (3–3)

Development of the Latin Christian community. Hist 111: 4th to 11th century. Hist 112: 11th to 13th century. (Hist 112—spring)

Andrews

113 **Early Middle Ages** (3)

Mediterranean region from 4th to 11th century; emphasis on Byzantium

116 **History of Africa** (3)

Survey of political, cultural, and economic development from ancient times to the present.

Schwoerer

121 **The Renaissance in Western Europe** (3)

Political, economic, intellectual, and cultural features of the Renaissance, 14th–16th centuries. Focus on Italy, but with attention to developments in France and England. (Fall)

Lavine

*127 **Theories of History** (3)

Critiques of philosophies of history: idea of progress, historicism, Hegelian-Marxian dialectic, cyclical, and social-scientific views. Contemporary problems of historical knowledge. (Fall)

Herbe

131–32 **History of Germany** (3–3)

Political, social, and cultural development. Hist 131: from Reformation to unification. Hist 132: from unification to present. (Hist 132—spring)

* An interdepartmental course offered by the departments of History and Philosophy.

138 **History of World Communism** (3) Thornton

The international communist movement from its beginnings to the present. (Fall)

139–40 **World History in the 20th Century** (3–3) Sachar

Diplomatic, political, and cultural factors. Hist 139: from the turn of the century to the Munich settlement of 1938. Hist 140: from the Munich settlement to present. (Academic year)

141–42 **History of France** (3–3) Herber

Political, social, and cultural development. Hist 141: from earliest times to Napoleon. Hist 142: from Napoleon to present.

143 **History of Eastern Europe** (3)

Poland, the Danube countries, and the Balkans in the 19th and 20th centuries. (Fall)

145–46 **History of Russia** (3–3) Thompson

Rise and revolution of Russia. Hist 145: the Old Regime, 800–1900. Hist 146: Revolution and Soviet rule since 1900. (Academic year)

*147 **Economic History of Europe** (3) Sharkey

Economic development since the Middle Ages; emphasis on the period following the Industrial Revolution. Evolution of capitalism and its impact upon the societies of Europe. (Spring)

149–50 **European Diplomatic History** (3–3) Davison

Emphasis on policies and actions of the great powers and their statesmen. Hist 149: to 1890. Hist 150: since 1890. Students who receive credit for Hist 150 cannot receive credit for Hist 157. (Academic year)

151–52 **History of England and Great Britain** (3–3) Kenny

Development of English civilization and its impact on Western culture. Hist 151: to 1689. Hist 152: since 1689. (Academic year)

153 **Tudor England** (3) Kenny

Aspects of the constitutional, social, intellectual, and religious development of England, 1485–1603. (Fall)

154 **Stuart England** (3) Schwoerer

Main currents from 1603 to 1714; emphasis on political, religious, social, and intellectual developments. (Spring)

157 **20th Century European Diplomatic History** (3) Sachar

The main currents, with necessary 19th century background. Students who receive credit for Hist 157 cannot receive credit for Hist 150. (Fall)

158 **Modern Jewish History** (3) Sachar

A secular history of the Jewish people from the 18th century to the present state of Israel, with particular emphasis on European political, economic, and cultural influences. (Spring)

162 **History of Spain and Portugal** (3) Staff

Political, social, and cultural aspects.

* An interdepartmental course offered by the departments of History and Economics.

163–64 **History of Latin America** (3–3) Staff
Political, social, and cultural development. Hist 163: through independence. Hist 164: the national period. (Academic year)

165 **History of Brazil** (3) Staff
Political, social, and cultural aspects.

166 **History of Mexico** (3) Staff
Political, social, and cultural aspects.

167 **American Colonial History** (3) Haskett
Settlement of colonies, development of provincial institutions, and emergence of American civilization in the 17th and 18th centuries. (Spring)

169 **The American Revolution** (3) DePauw
The crisis of the British Empire after the Seven Years War, the War for Independence, the Confederation period, the making and ratification of the Federal Constitution. (Fall)

170 **U.S. Early National History** (3) Hill
Political, diplomatic, economic, and social history of the early republic, 1789–1828. (Fall)

171–72 **U.S. Social History** (3–3) Gray
Hist 171: daily life, institutions, intellectual and artistic achievements of the Agrarian Era, 1607–1861. Hist 172: the Urban-Industrial Era from 1861 to present. (Academic year)

173–74 **The Negro in American History** (3–3) Brown
The place of Black Americans in the corpus of American history. (Academic year)

175–76 **U.S. Political History** (3–3) Haskett
Hist 175: to the Civil War. Hist 176: Civil War to New Deal. (Academic year)

177 **The Ante-bellum South** (3) DePauw
Development of the South as a section in the ante-bellum period. (Spring)

*179–80 **U.S. Economic History** (3–3) Sharkey
Process of economic growth from Colonial times to the present. Development of various sectors in the economy and their interdependence. Hist 179: 1607–1865. Hist 180: from 1865 to present. (Academic year)

181–82 **U.S. Diplomatic History** (3–3) Merriman, Hi
Survey of American foreign relations from the era of the American Revolution. Hist 181: to 1898. Hist 182: 20th century. (Academic year

183 **Oversea Expansion of the United States** (3) Merriman
Political, economic, social, and cultural life of our outlying possessions

* An interdepartmental course offered by the departments of History and Economics.

184 **Canada and the United States** (3) — Merriman

Historical background and main trends in the relationship of the two English-speaking peoples of North America. (Spring)

185 **Representative Americans** (3) — Gray

Significant and pivotal personalities in government, business, science, religion, journalism, the arts, and social reform. (Fall)

186 **U.S. Urban History** (3) — Gutheim

Development and characteristics of American cities. (Fall)

187 **History of Modern China** (3) — Johnson

China since 1840, particular attention to political developments. (Fall)

188 **History of Chinese Communism** (3) — Thornton

Survey of the leadership, ideology, structure, and operation of the Communist Party of China from its founding to the present. (Spring)

189 **History of Modern Japan** (3) — Sigur

191–92 **Senior Honors Thesis** (3–3) — Staff

Required of and open only to undergraduate honors candidates in history. (Academic year)

193 **History of the Near East** (3) — Davison

Byzantine, Arab, Persian, and Islamic backgrounds; rise and decline of the Ottoman Empire; action of European powers in the area; Ottoman breakup into the Turkish Republic and other states. (Fall)

194 **History of the Modern Near East** (3) — Sachar

Beginning with Napoleon's invasion of Egypt. Interaction of Europe with western Asia, emphasis on the Turkish Straits, Suez, Anglo-French imperialism; Turkish, Balkan, Arab, and Jewish nationalism, and the recent Soviet intrusion.

195–96 **History of East Asia** (3–3) — Johnson

Civilizations of China and Japan; emphasis on institutional development. Hist 195: beginnings to about 1800. Hist 196: from eve of the modern era to present. (Academic year)

199 **Proseminar: Readings for the History Major** (3) — Staff

Required of senior history majors. Readings and discussions on major trends in history; representative selections from the classics of historical literature. Students who receive credit for Hist 199 cannot receive credit for Hist 201. (Fall and spring)

THIRD GROUP

Prerequisite to all third-group History courses: the appropriate second-group preparation and consent of instructor.

201 **History and Historians** (3) — Staff

Students who receive credit for Hist 201 cannot receive credit for Hist 199. (Fall and spring)

203–4 **Research Seminar** (3–3) Staff
Prerequisite: Departmental approval. (Academic year)

205–6 **Seminar: Modern History of Eastern Europe** (3–3) Petrov
East Central and Southeastern Europe in the 19th and 20th centuries. Hist 205: to the mid-1930's. Hist 206: to the communist take-over (1948). (Academic year)

208 **Research Seminar: History of World Communism** (3) Thornton

209–10 **Seminar: Ancient History** (3–3) Hadley
Prerequisite: Hist 108, 109, or 110; or equivalent. (Academic year

211–12 **Seminar: Medieval History** (3–3) Andrews
Prerequisite: Hist 111–12 or equivalent. (Hist 212—spring)

215–16 **Junior Seminar** (3–3) Staff
Primarily for juniors. Study and discussion of selected topics. Admission by permission of instructor. (Academic year)

*231 **Seminar: Sino-Soviet Relations** (3) Michae
Background, development, and status of conflict within the communi movement; emphasis on the role of Chinese communists. Prerequisite: semester hours selected from Hist 187; P Sc 101, 194; or equivalent. (Spring)

237 **Seminar: Soviet Foreign Policy, 1917–1953** (3) Petr
Revolutionary concept of diplomacy. Parallel instruments of foreign pol during era of "capitalist encirclement," 1917–1939. From Nazi-Sov partnership to the alliance with the West. Foreign policies of the war. (Fall)

241–42 **Research Seminar: Modern European History** (3–3) Her
Prerequisite: appropriate preparation and consent of instructor. (A demic year)

245–46 **Research Seminar: Russian History** (3–3) Thomp
Prerequisite: Hist 145–46 or equivalent. (Hist 246—spring)

248 **Reading Seminar: Modern European and Near Eastern History** (3)
Admission by permission of instructor.

249–50 **Research Seminar: European Diplomatic History** (3–3) Da
Prerequisite: Hist 149 or 150 or equivalent. Reading knowledge of Fr or German required. (Hist 249—fall)

251–52 **Research Seminar: English History** (3–3) Kenny, Schw
Prerequisite: Hist 151–52 or equivalent. (Hist 251—fall)

261–62 **Research Seminar: Latin American History** (3–3)
Prerequisite: 6 semester hours selected from Hist 162, 163–64, 165 (Academic year)

271–72 **Research Seminar: U.S. Social History** (3–3)
Prerequisite: Hist 171–72 or equivalent. (Hist 271—fall)

* An interdepartmental course offered by the departments of History and Political Science.

*273–74 **Research Seminar: Materials in American Negro Culture** (3–3) Brown
Prerequisite: Hist 173–74 or equivalent. (1973–74 and alternate years—academic year)

275–76 **Research Seminar: U.S. Political History** (3–3) Haskett
Prerequisite: Hist 175–76 or equivalent. (Academic year)

278 **Research Seminar: American History** (3)
Admission by permission of instructor.

281–82 **Research Seminar: U.S. Diplomatic History** (3–3) Merriman
Prerequisite: Hist 181–82 or equivalent. (Academic year)

283–84 **Research Seminar: Recent U.S. History** (3–3) Hill
Prerequisite: 6 semester hours of 100-level American History courses. (Hist 283—fall)

285–86 **Research Seminar: Early American History, 1607–1828** (3–3) Hill, DePauw
Prerequisite: Hist 170, 175, or 181; or equivalent.

287 **Seminar: Problems in Latin American Civilization** (3) Gordon
Interdisciplinary seminar partially guided by a specialist within the methodology of his chosen discipline; each student writes a report on some aspect of a selected key theme. Admission by permission of instructor. (Spring)

288 **Research Seminar: History of Chinese Communism** (3) Thornton
(Spring)

291 **Research Seminar: 20th Century Problems—Era of World War I** (3) Sachar
(Fall)

292 **Research Seminar: 20th Century Problems—Era of World War II** (3) Sachar
(Spring)

293–94 **Research Seminar: the Modern Near East** (3–3) Davison
Prerequisite: Hist 193 or equivalent. (Hist 294—spring)

295–96 **Research Seminar: the Modern Far East** (3–3) Johnson
Prerequisite: Hist 195–96 or equivalent.

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

Prerequisite to all fourth-group History courses: the appropriate second-group preparation and consent of instructor.
Fourth-group History courses are limited to graduate students; but they are primarily for doctoral candidates.

*Offered jointly by the Department of History and the American Studies Program.

311–12 **Readings in Medieval History** (3–3)
(Hist 312—spring)

341–42 **Readings in Modern European History** (3–3)
(Hist 342—spring)

345–46 **Readings in Russian History** (3–3)
(Hist 345—fall)

351–52 **Readings in English History** (3–3)

361–62 **Readings in Latin American History** (3–3)

371–72 **Readings in American Social History** (3–3)

*373–74 **Readings on the Negro in American Culture** (3–3)
(1972-73 and alternate years—academic year)

375–76 **Readings in U.S. Political History** (3–3)
(Hist 375—fall)

†379–80 **Readings in Economic History** (3–3)
(Academic year)

381–82 **Readings in American Diplomatic History** (3–3)
(Hist 381—fall)

385–86 **Readings in Early U.S. History** (3–3)
(Hist 385—fall)

387–88 **Readings in the History of Sino-Soviet Relations** (3–3)
(Hist 387—fall)

395–96 **Readings in Modern Far Eastern History** (3–3)
(Hist 395—fall)

398 **Advanced Readings and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Honors Program—Columbian College

H.E. Yeide, Jr., *Coordinator*

Limited to selected sophomores (see page 73).

* Offered jointly by the Department of History and the American Studies Program.
† An interdepartmental course offered by the departments of History and Economics.

IRST GROUP

1 **Seminar: the Great Ideas of the West** (3)

Reading, discussion, and research involving works crucial to an understanding of the great Western ideas—their historical development and contemporary relevance. Examination of problems and categories that lie at the roots of most modern scholarly disciplines. (Fall)

21–22 **Seminar: Contemporary Problems** (3–3)

Reading, discussion, and research dealing with one major contemporary problem each semester, utilizing the perspectives and insights of various academic disciplines. (Academic year)

23 **Independent Honors Study** (3)

Admission by prior approval of Honors Program Advisory Committee. A major study project supervised by a faculty member. A significant paper or report required. (Spring)

ıstitute for Sino-Soviet Studies

EMBERS OF THE INSTITUTE

ston Sigur (*Director*), C.F. Elliott, Andrew Gyorgy, H.C. Hinton, W.R. nson, W.H. Kraus, C.A. Linden, F.H. Michael, C.A. Moser, Vladimir rov, Chung-wen Shih, R.B. Thompson, Richard Thornton, R.K. White, Y.C. Yin

SSOCIATE MEMBERS OF THE INSTITUTE

seph Baclawski, John Hardt, Tao-tai Hsia, Bernard Ramundo, Philip True, Wolfe

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The Institute for Sino-Soviet Studies offers specialized graduate study in the School of Public and International Affairs. Students who lack background in Soviet and Chinese studies are required to take undergraduate courses selected by the adviser as prerequisite to graduate work. Related preparatory undergraduate courses include the following: Econ 133, 134, 169, 170; Hist 138, 143, 145–46, 187, 188, 189, 195–96; P Sc 101, 112, 115, 160, 161, 162, 163, 193, 194; Psyc 151.

For description of the objectives and programs of the Institute, see pages 172–73.

For descriptions of the courses listed below, see the appropriate departmental listing.

ECONOMICS

267 *Seminar: Soviet Economy* (3)	Hardt
268 *Seminar: Economic Theory and Development in Communist Countries* (3)	Hardt
269 *Economy of Communist China I* (3)	Yin
270 *Economy of Communist China II* (3)	Yin
271 *Economy of Japan* (3)	Staff

GEOGRAPHY

265 *Seminar: Geography of the Soviet Union* (3)
266 *Seminar: Geography of China* (3)

HISTORY

205–6 *Seminar: Modern History of Eastern Europe* (3–3)
208 *Research Seminar: History of World Communism* (3)
237 *Seminar: Soviet Foreign Policy, 1917-1953* (3)
245–46 *Research Seminar: Russian History* (3–3)
288 *Research Seminar: History of Chinese Communism* (3)
295–96 *Research Seminar: the Modern Far East* (3–3)
345–46 *Readings in Russian History* (3–3)
387–88 *Readings in the History of Sino-Soviet Relations* (3–3)
395–96 *Readings in Modern Far Eastern History* (3–3)

POLITICAL SCIENCE

213–14 *Comparative Communist Systems* (3–3)
215–16 *Seminar: the Communist Camp in World Politics* (3–3)
224 *Readings in Socialism and Communism* (3)
227 *Seminar: Governments and Politics of Eastern Europe* (3)
229 *Readings in Soviet Government and Politics* (3)
231 *Seminar: Sino-Soviet Relations* (3)
232 *Seminar: International Communications* (3)
233 *Seminar: Soviet Government and Politics* (3)
234 *Soviet Political Process* (3)
237 *Chinese Law* (3)
238 *Soviet Law* (3)
253 *Seminar: Chinese Government and Politics* (3)
254 *Colloquium: Modern China* (3)
255 *Colloquium: Russia and Eastern Europe* (3)
257 *Seminar: Communism in Developing Countries* (3)
258 *Seminar: Communist Parties in the Noncommunist World* (3)
265–66 *Chinese Communist Policy Processes* (3–3)
269 *Seminar: Soviet Foreign Policy* (3)
270 *Political and Social Institutions of Eastern Europe* (3)
274 *Principles and Problems of International Political Communications* (3)
288 *Seminar: Soviet Military Policy and Strategy* (3)
294 *Seminar: Governments and Politics of Japan and Korea* (3)
295 *Seminar: Chinese Communist Foreign Policy* (3)
296 *The Communist Role in Far Eastern International Politics* (3)
298 *Southeast Asia in World Politics* (3)
325 *Research Seminar: Topics in Marxism-Leninism* (3)

PSYCHOLOGY

259 *Seminar: Social Psychology of Communism* (3)

ternational Affairs

e "Public and International Affairs."

lian

e "Romance Languages and Literatures."

panese

e "East Asian Languages and Literatures."

rnalism

fessorial Lecturer F.L. Dennis
ciate Professors R.C. Willson (*Chairman*), Philip Robbins
ciate Professorial Lecturers H.L. Coppenbarger, T.R. Smith, Peter Weaver
tant Professorial Lecturers H.E. Paine, G.E. Trainor, R.L. Courage

Bachelor of Arts with a major in Journalism (Departmental).—The following re-irements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students planning to or in Journalism should take Engl 4 rather than Engl 2 in satisfying the English sition requirement.)
2. Prerequisite courses—Engl 51–52 or 71–72; Jour 71–72; P Sc 4 and 6 or and 6.
3. Required courses in the major—24 hours of second-group courses in Journal-including (a) Jour 111, 196, 198; and (b) 9 semester hours chosen from Jour 33, 137, 138, 139, 151.
4. Required as a minor area of concentration—a minimum of 18 semester hours cond-group courses, chosen in consultation with the major adviser, in one other rtment of Columbian College of Arts and Sciences. Students electing a minor in science may fulfill this requirement with courses in more than one depart-

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Departmental prerequisite: Jour 111 with a grade of *B* or better is prerequisite Jour 125, 133, 137, 138, 139, and 196.

RST GROUP

71–72 **Introduction to Mass Communication (3–3)** **Willson**

Jour 71: evolution of newspapers and other media in relation to political, social, and economic life; concept of press freedom. Jour 72: mass media, problems of contemporary journalism, emphasis on media-government relations. **(Academic year)**

SECOND GROUP

111 **Reporting** (3) Robbin
Gathering, evaluating, and writing news. Laboratory fee, $5. (Fall and spring)

115 **Newspaper Editing and Make-up** (3) Coppenbarger
Preparation of news copy, pictures, and other graphic material for publication; evaluation of news; page layouts; newspaper make-up. (Spring)

116 **Magazine Layout and Design** (3) Faust
Layout, typography, and design for magazines, newsletters, house organs, and similar publications for associations, institutions, and industry. (Fall)

117 **Magazine Editing** (3)
The editor's responsibility to publisher and readers. Setting the editorial goals and planning content and production to meet them. Editing copy for general and specialized magazines.

121 **Feature Writing** (3) Willson
Free-lancing magazine articles, material obtained through independent investigation. (Fall)

125 **Science Writing** (3)
Writing science news for the mass media.

133 **Advanced Reporting: Community News** (3) Robbin
Coverage and writing of local news. (Fall)

137 **Advanced Reporting: National Affairs** (3)
Coverage and writing of federal government news from the point of view of the press association. (Spring)

138 **Investigative Reporting** (3) Weaver
In-depth reporting in selected areas of political, economic, and social affairs. (Fall and spring)

139 **Advanced Reporting: Radio and Television News** (3)
Preparing news and public affairs programs for broadcast media. Smith

140 **Photojournalism** (3)
Photographic techniques affecting publication, illustration and story angle, standards of judgment in selection and use of pictures, captions, editing technique, cropping for effective reproduction. Laboratory fee, $2. (Spring) Trainer

145 **Principles and Problems of Public Relations** (3)
Principles, problems, and ethics of public relations for government agencies, commercial establishments, educational and other public institutions. Case histories of successful programs. (Fall) Courtright

146 **Government Information** (3)
Growth of information activities in government and the role of the information specialist. Writing and editing for government information operations. (Spring)

150 News Coverage in Washington (3) — Robbins

A survey of the way news is gathered and reported in the Nation's Capital by wire services, newspaper bureaus, and the local dailies. Field trips to major news centers; practice coverage.

151 Editorial Writing (3) — Robbins

Techniques of editorial writing, conducting the editorial page, function of editorials and columns of news commentary in a free press. (Spring)

190 Internship in Journalism (3)

Study of a journalistic medium in action by assignment to a Washington area news office. Admission restricted to Journalism majors selected by a departmental committee. (Fall and spring)

***195 Documentary Photography (3)** — Lake and Staff

Social problems, team-taught. Each student will work on projects with social dimensions. Laboratory fee, $25. Admission by permission of instructor. Limited enrollment. (Spring)

196 Seminar (3) — Willson

For Journalism majors only. Research, individual and team writing of news, features, interpretative reports, and editorials on current major problem areas. (Spring)

198 Law of the Press (3) — Dennis

Freedom of the press, censorship, legislative controls, publications as contempt of court, copyright, newsgathering agencies, labor law and the newspaper business, law of libel, privileged matter, fair comment on public characters, right of privacy. (Fall)

American Studies

MITTEE ON LATIN AMERICAN STUDIES

rin Gordon (*Chairman*), T.F. Carroll, H.H. Hinrichs, R.L. Humphrey, Jr., Robb, K.L. Storrs

chelor of Arts with a major in Latin American Studies (Interdepartmental).—following requirements must be fulfilled:

The general requirements as stated on pages 78, 83–88.

Prerequisite courses—6 semester hours chosen from the following: Anth 2, 1, P Sc 4 or 5.

Required courses in related areas—Span 1–2, 3–4; or equivalent. (Span 9–10 uivalent is recommended.)

Required courses in the major—(a) Anth 172; Econ 185–86; Geog 161; Hist 64, P Sc 177, 178; and 6 semester hours chosen from Span 151–52, 155–56, 58, or other approved courses. (b) 18 semester hours, including an interdisary seminar (287) in one of the following areas: Anthropology, Economics, aphy and Regional Science, Hispanic Literatures, History, or Political Science. equired courses listed in (a) which are in the selected area may be included mputing the required 18 semester hours for (b).

*Departmental course offered by the departments of Journalism and Art.

Master of Arts in the field of Latin American Studies.—See "Public and International Affairs," pages 389–90.

Candidates for the degree of Doctor of Philosophy may elect Latin American History as an area of specialization in the field of History, Spanish American Literature as an area of specialization in the field of Romance Languages and Literatures, or Politics of Latin America as an area of specialization in the field of Political Science.

COURSES DEALING WITH LATIN AMERICA

Anthropology—170, 172, 184, 185, 262, 268, 287
Economics—185-86, 233, 234, 285-86, 287
Geography and Regional Science—127, 161, 261, 287
History—162, 163-64, 165, 166, 261-62, 287, 361-62
Political Science—177, 178, 277-78, 287
Portuguese—31-32
Spanish—91-92, 151-52, 155-56, 157-58, 197-98, 253, 255, 256, 261, 266, 287

Management Science

Professors R.F. Ericson, G.L. Lippitt, D.D. Roman, Edwin Timbers, Al Wofsey
Professorial Lecturers C.W. Clewlow, Jerome Bracken, Charles Laidlaw
Associate Professors J.F. McCarthy, Jr., R.L. Holland, L.H. Mantell, E.A. Winslow (*Chairman*), Jerry Harvey, W.E. Smith
Adjunct Associate Professor H.C. Demoody
Associate Professorial Lecturer J.T. McGill
Assistant Professors Elizabeth Adams, J.W. Waldrip, John Lobuts, Jr., D.A. Rasmussen
Assistant Professorial Lecturer W.H. Farthing

SECOND GROUP

118 **Introduction to Data Processing** (3) Demoody, Waldrip

Basic principles and methods. A management-oriented introduction to the fundamentals, potentials, and problems of computer-based data processing as a tool for record-keeping, resource-controlling and decision-making. (Fall and spring)

119 **Data Processing Programming** (3)

Basic principles and methods. Problem-solving illustrated through analysis, flow charting, and programming of business-oriented data processing problems. Students write programs in FORTRAN and COBOL using the University's IBM 360 computer. Prerequisite: Mgt 118. (Fall and spring)

120 **Data Processing Systems** (3) Demoody, Waldrip

Assessment of the systems concept and its relationship to management organization, data, and information. Principles and techniques of analysis, design, and implementation of computer-based data and information systems; management of systems planning resources. (Fall)

THIRD GROUP

201 **Advanced Administrative Management** (3) Mantell, Eastin, Brown

Principles and practices common to administrative units of all kinds. (Fall and spring)

203 **Mathematics for Management** (3) Holland, Paik

Mathematical concepts employed in the solution of management problems. Applications of analytical geometry, functions, elements of calculus, and linear algebra to optimization problems. Prerequisite: algebra. (Fall and spring)

204 **Quantitative Factors in Administration** (3) Holland, Paik, Rasmussen

Survey of quantitative techniques used in the solution of management problems. Potentials and limitations of mathematical models and proper areas for their application. Topics include probability, statistical decision theory, linear programming, waiting line, inventory replacement models. (Fall and spring)

207 **Human Behavior in Organizations** (3) Lippitt, Winslow

Individual, group, intergroup, and other human behavior and development; application of social science research to administration. Practical applications emphasized. (Fall and spring)

208 **Current Issues in Organizational Behavior** (3) Winslow

Study of behavioral factors relating to issues such as automation, ethics, labor-management relations, and similar problems. Problems in behavioral science research. Prerequisite: Mgt 207. (Fall and spring)

210 **Behavioral Factors in the Process of Change** (3) Harvey

Current research and theory related to the process of change. Basic principles of planned change; individual, group, organization, community, and cultural change. Emphasis on human behavior research related to the change process. Prerequisite: Mgt 208. (Fall)

212 **Organizational Development: Concepts and Methods** (3) Lippitt

Primarily for doctoral students. Examination of different concepts of organizational structure and growth. Models of organizational change will be developed with a taxonomy of methods of initiating action to further organizational development. The methods of action, research, team building, confrontation methods, objectives analysis, survey research, and structural revision will be related to organizational development. Prerequisite: Mgt 210 or equivalent. (Fall)

213 **Consultative Processes in Organizations** (3) Lippitt, Harvey

Primarily for doctoral students. Examination through actual practice as well as theory of the nature of the helping process between one person or group and another person or group. Dynamics of the consulting process will be explored as well as role differences in internal and external consultation. Development of skill in the helping relationship will be furthered within the framework of interpersonal relation concepts and laboratory experiences. Prerequisite: Mgt. 210 or equivalent. (Spring)

218 **Survey of Data Processing** (3) Adams, McCarthy, Wofsey, Demoody

A management-oriented presentation of the vocabulary, concepts, and

trends in computer hardware and software, information systems desig
and development, organizational impact, and effective management; mile
stones of past and current research; computer technology as a rapidly
evolving force of major significance in business, government, and indus
try. Designed to provide comprehension of information technology nec
essary for contribution to an organizational data processing effort or
preparation for more advanced study. (Fall and spring)

Smith

219 **Digital Computer Programming Concepts** (3)

Programming concepts, techniques, and practices as applied to third ge
eration computers. Fundamentals of higher-level languages, flow charting
FORTRAN, COBOL, operating systems, and utility programs. Student
programs are run on the University Computer Center's IBM 360 com
puter. This course will provide the student with an understanding of the
role of computer programming in management information systems and
management research. Prerequisite: Mgt 218 or permission of instructor.
(Spring)

Wofsey

220 **Comparative Digital Computer Systems and Their Management** (3)

Characteristics and capacities of the range of data processing equipment
in use today, special purpose equipment in business and government, re
cent and prospective equipment developments, and selection of computer
and related equipment. Prerequisite: Mgt 218 or permission of instructor.
(Fall and spring)

McCarthy

221 **Management Information Systems Development and Application** (3)

Development of management information systems, integration of data
processing in operations of government or business, impact on manage
ment organization and decision-making. Case studies. Prerequisite: Mgt
218 or 219, or permission of instructor. (Fall and spring)

Wofsey

222 **Seminar: Advanced Digital Computer Concepts** (3)

Current problems in the design and implementation of computer-based
systems; emphasis on current state-of-the-art through discussion with lead
ing experts in the field and analysis of literature. Admission by permis
sion of instructor. (Fall and spring)

Adam

223 **Management of a Data Processing Organization** (3)

Advanced course in information technology; emphasis on principles, pra
tices, and trends in the management of data processing. Unique prob
lems, functions, and requirements of data processing management, stress
ing executive interaction in decision-making, planning, and evaluation
functions. Prerequisite: Mgt 218 and either 219 or 220; or permission of
instructor. (Fall and spring)

Mantell, Enscoe

224 **Theory and Management of Systems** (3)

Introduction to systems theory and qualitative systems analysis. Analysis
of systems in organizations and their impact on management: system
point of view, enterprise as a system, effect of technical and management
systems on organization structure, information-decision systems. System
design, and dynamic aspects of organizational systems. Prerequisite: Mgt
201, 204, 207. (Fall)

225 **Introduction to Managerial Statistics** (3) McGill

The mathematics of probability and statistics and its applications in management science and operations research. Topics include random variables; discrete and continuous probability distributions; moments and other descriptive measures; sampling theory; and an introduction to statistical estimation, hypothesis testing, and regression analysis. Prerequisite: Mgt 203 or equivalent. (Fall and spring)

226 **Managerial Statistics** (3) McGill

Management applications of the theory and techniques of mathematical statistics. Topics include maximum likelihood and other methods of estimation, hypothesis testing, descriptive measures of bivariate distributions, regression and correlation, analysis of time series, econometric models and multiple regression, statistical decision theory, and the revision of probabilities in decision-making. Prerequisite: Mgt 225. (Fall and spring)

227 **Mathematical Programming: Techniques and Applications** (3) Bracken

Technical and management considerations of linear and nonlinear programming. Mathematical and computational aspects of linear programming. Formulation of linear programming models. Studies of applications of linear programming. Introduction to theory and application of nonlinear programming. Prerequisite: Mgt 203 or equivalent. (Fall)

228 **Systems Analysis by Simulation** (3) Bracken, Holland

Survey and introduction to contemporary operations research techniques. Analytical methods such as simulation, queuing, Markov chains, dynamic programming, game theory, and network flows. Prerequisite: Mgt 225, 227.

229 **Seminar: Management Science and Operations Research** (3) Bracken

Supervised study in depth and advanced projects in management science and operations research. Prerequisite: Mgt 226, 227; or permission of instructor. (Spring)

230 **Administration of Research and Development** (3) D. Roman

Examination of technological, political, and economic factors affecting the R&D environment; operational aspects; management problems in military, governmental, and industrial organizations; project selection, resource allocation, personnel, planning and control, measurement and evaluation. (Fall)

231 **Seminar: Administration of Research and Development** (3) D. Roman

Individual and/or group in-depth research projects dealing with various phases of research and development management. Topic will vary each time the course is offered according to the emerging technology, current operational problems, and student interest. Prerequisite: 6 to 9 semester hours of research and development management or permission of instructor.

262 **Seminar: Contemporary Administrative Theory** (3) Ericson

Primarily for doctoral students. Current and prospective theory and practice from an inter- and trans-disciplinary viewpoint. Topics include gen-

eral systems theory, game theory, axiology and management values, ana
thetics, value engineering, cybernetic systems, decision theory, innovation
and creativity models, and general semantics. Prerequisite: Mgt 201,
204, 207, 224. (Fall and spring)

295 **Research Methods** (3)

Research techniques, sources of information, array and analysis of data,
interpretation and presentation of the findings. (Fall and spring)

Mathematics

Professors David Nelson, T.P.G. Liverman (*Chairman*), Hewitt Kenyon, Choy-
Tak Taam
Professorial Lecturers D.M. Dribin, Joseph Blum, B.J. McDonald, A.B. Willcox
Associate Professors W.A. Smith, Dagmar Henney, Irving Katz, I.I. Glick
M.D. Green, Ruth Bari, Myrna Lee
Assistant Professors E.A. Stone, H.D. Junghenn
Assistant Professorial Lecturer Mabel Morris

Bachelor of Arts or *Bachelor of Science with a major in Mathematics (Depart-
mental).*—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88.
2. Prerequisite courses—Math 31, 32, 33 (Math 30, a prerequisite to Math 31,
may be waived upon examination before registration).
3. Required courses in the major—a minimum of 24 semester hours of second
group courses in Mathematics, including Math 106, 121, 123, 139, and 140. It
also strongly recommended that students take French, German, or Russian, and
mathematically related courses in such subjects as Physics, Statistics, Economics
and Engineering.

Bachelor of Arts or *Bachelor of Science with a major in Applied Mathematics
(Departmental).*—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88.
2. Prerequisite courses—Math 31, 32, 33, 34 (Math 30, a prerequisite to Math
31, may be waived upon examination before registration).
3. Required courses in related areas:

(a) Stat 189–90.

(b) Eighteen semester hours to be selected, in consultation with the advisor,
from the following Areas of Application. At least 12 semester hours must be chosen
from one Area, and the other 6 semester hours must be chosen from courses num-
bered 101 or higher. For courses in Applied Science, Civil Engineering, Electrical
Engineering and Computer Science, Engineering Administration, Mechanical Engi-
neering, and Operations Research, see the *School of Engineering and Applied Science*
catalogue.

Area I. Social and Management Sciences—courses chosen from Ap S 115, C
183, 195, 197; Econ 1–2, 101, 102, 123, 199; E Ad 261, 269, 281–82, 283, 2
EE 184, 283, 284, 285; Math 101, 102, 113, 124; OR 201, 209, 251, 252, 2
277, 279, 281, 291; Stat 113, 117, 118, 131, 157–58, 159, 161–62, 165–66, 1
197.

Area II Engineering and Physical Sciences—courses chosen from Chem 111-
113; CE 120, 123, 140, 166, 167, 168, 185, 186, 190, 191, 192, 193, 196,
201, 202, 203, 204, 205, 206, 207, 210, 213, 220, 223, 252, 254, 258, 261,
263, 275; Stat 107, 117, 118, 131, 157–58, 159, 161–62, 197; and any course

in Electrical Engineering and Computer Science, Mechanical Engineering, or ...tics.

Area III. Computer Sciences—courses chosen from EE 152, 153, 154, 157, 158; ...th 102, 113, 124, 142, 153, 154, 157; Stat 113, 157–58, 161–62, 165–66, 197.

4. Required courses in the major—a minimum of 24 semester hours of second-...up courses in Mathematics, including Math 111, 112, 139, 140, 181–82. It is also ...ngly recommended that students take French, German, or Russian.

Master of Arts in the field of Mathematics.—Prerequisite: a Bachelor's degree ... **a major in Mathematics from this University, or an equivalent degree.**

Required: the general requirements, pages 93–100. Students must complete 30 ...ester hours of approved course work with or without a thesis. The language ...uirement (see page 99) must be satisfied in French, German, or Russian.

Master of Arts or *Master of Science in the field of Applied Mathematics.*—Pre-...isite: a Bachelor's degree with a major in Mathematics or a related field such ... Statistics, a physical science, Engineering, or Economics.

Required: the general requirements, pages 93–100, including satisfying the language ...rement in French, German, or Russian Course work is divided between Mathe-...tics courses and courses from one Area of Application—Economics, Engineering ...vil, Computer Science, Electrical, Engineering Administration, Mechanical, or ...erations Research), Physics, Statistics, Urban and Regional Planning. Courses in ... chosen Area of Application are selected in consultation with the relevant de-...rtment.

Candidates for the degree of *Master of Arts* must complete 30 semester hours of ...osed course work, including Math 299–300 *Thesis Research.* At least 12 se-...ster hours must be in Mathematics courses, with no more than 3 of these from ...ond-group courses. The remaining courses are chosen from the selected Area of ...lication. Theses are jointly supervised by the Department of Mathematics and ... department concerned with the Area of Application.

Candidates for the degree of *Master of Science* must complete 30 semester hours ... course work; at least 15 of these must be in Mathematics courses, with no more ...n 6 semester hours from second-group courses. There is no thesis requirement.

Master of Science for Teachers.—Prerequisite: A Bachelor's degree; at least 12 ...ester hours or equivalent in Mathematics courses, including the equivalent of ...th 31; experience in teaching mathematics at the secondary school level.

Required: 30 semester hours of approved second- or third-group Mathematics ...rses, including Math 168.

Doctor of Philosophy in the field of Mathematics.—Required: the general require-...nts, pages 93–97, 100–102. The Departmental doctoral program committee, after ...sultation with the student, will stipulate (1) courses which must be taken to ...fy: the 48-semester-hour requirement leading to the General Examination; (2) ...e two languages, selected from French, German, and Russian, which must satisfy ...e foreign language requirement; and (3) the four areas of study in which the ...dent must prepare for the General Examination. The doctoral program committee ...y appoint a Director of Research when the student has selected (preferably early ...his program) one of the following research fields for his dissertation: Functional ...lysis (Abstract Differential Equations, Functional Equations, Generalized Func-...ns, Groups of Operators), Group Representations, Linear Algebra (Matrix The-..., Logic, Measure and Integration, Ordinary and Partial Differential Equations, ...ory of Numbers, and Topology (General Topology, Analytic Topology, Topo-...ical Groups).

Bachelor of Arts in Education with a teaching field in Mathematics.—Prerequisite: ...e Education curriculum, pages 80–81.

Required: the Mathematics option and the professional courses listed on pages ... 119.

FIRST GROUP

3 College Algebra (3) Morris and Staff

Equivalent to the standard two years of high school algebra with several additional topics. Prerequisite: one year each of high school algebra and high school geometry. (Fall and spring)

6 Plane Trigonometry (3) Morris and Staff

Prerequisite: two years of high school algebra and one year of high school geometry, or Math 3 (or concurrent registration therefor). (Fall and spring)

9 General Mathematics I (3) Smith and Staff

For students electing Math 9 and 10 as a terminal sequence. Logic, sets, number systems. Prerequisite: two years of high school mathematics. (Fall and spring)

10 General Mathematics II (3) Smith and Staff

Mathematical systems, geometry, and introduction to statistics and probability. Prerequisite: Math 9. (Fall and spring)

30 Precalculus (3) Bari and Staff

Set theory, inequalities, basic analytic geometry, functions and relations. Polynomial, trigonometric, logarithmic, and exponential functions. Prerequisite: Math 3 and 6; or one and one-half years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry; or equivalent. Prior to registration, new students should take a placement examination in algebra and trigonometry. (Fall and spring)

31 Calculus of One Variable (3) Green and Staff

Differentiation and integration of algebraic and elementary transcendental functions, with simple applications. Prerequisite: Math 30 or equivalent.* (Fall and spring)

32 Calculus of Several Variables (3) Green and Staff

Partial derivatives, multiple integrals, infinite series. Prerequisite: Math 31. (Fall and spring)

33 Calculus of Vector Functions (3) Green and Staff

Elementary linear algebra, vectors, and matrices. Vector calculus, implicit function theorem. Prerequisite: Math 32. (Fall and spring)

34 Introduction to Linear Algebra (3) Katz and Staff

Linear functions, solutions of equations, dimension and rank, determinants, eigenvalues, change of basis. Prerequisite: Math 31 or permission of instructor. (Fall and spring)

SECOND GROUP

101 Introduction to Mathematical Logic (3) Nebe

Introduction to proof theory and model theory of propositional and predicate calculi, computability, topics from foundations of mathematics. Open to sophomores with permission of Department. Prerequisite: Math 31 or permission of instructor. (Fall)

* Math 30 may be waived as a prerequisite by examination on scheduled dates.

102 Axiomatic Set Theory (3) — Nelson

Zermelo-Fraenkel set theory, ordinals and cardinals, foundations of the real number system. Prerequisite: Math 101 or permission of instructor. (1973–74 and alternate years—spring)

106 Introduction to Topology (3) — Green

Prerequisite: Math 139 or permission of instructor. (Spring)

107 Introduction to Algebraic Topology (3) — Bari

Prerequisite: Math 122 and 139, or permission of instructor. (1972-73 and alternate years—fall)

111 Mathematics for Engineers and Physicists I (3) — Henney and Staff

Differential equations, linear and multilinear algebra, Laplace transform. Prerequisite: Math 33, 34; or permission of instructor. (Fall)

112 Mathematics for Engineers and Physicists II (3) — Henney and Staff

Fourier integral, Fourier series, partial differential equations. Prerequisite: Math 111. (Spring)

113 Graph Theory (3) — Bari and Staff

Directed and undirected graphs; bridges, cutpoints, and blocks; connectivity; partitions; Eulerian and Hamiltonian graphs; planarity; coloring problems. Prerequisite: Math 32.

121–22 Introduction to Abstract Algebra (3–3) — Lee and Staff

Selected topics in elementary number theory, groups, rings (including polynomial rings), and fields. Open to sophomores with permission of Department. Prerequisite: Math 32 or permission of instructor. (Academic year)

123 Linear Algebra (3) — Lee and Staff

Theory of vector spaces, linear transformations, and matrices. Quadratic and bilinear forms, spectral decomposition. Prerequisite: Math 121. (Fall)

124 Introduction to Matrix Theory (3) — Katz and Staff

Operations on matrices, linear equations, matrix inversion, vector spaces, characteristic roots and vectors, spectral theorem, quadratic forms. Prerequisite: Math 32, 34. (Spring)

134 Introduction to Boundary Value Problems (3) — Blum

Prerequisite: Math 111 or 142. (1972–73 and alternate years—spring)

135 Projective Geometry (3) — Dribin

Prerequisite: Math 123 or 124, or equivalent. (1973–74 and alternate years—fall)

139 Advanced Calculus I (3) — Liverman and Staff

Review and extension of elementary one-variable calculus, emphasis on the theoretical foundations; differential calculus of several variables. Prerequisite: Math 33. (Fall and spring)

140 Advanced Calculus II (3) — Liverman and Staff

Differential and integral calculus of several variables; implicit function

theorem; differential forms. Prerequisite: Math 139 or equivalent. (Spring)

142 **Theory of Differential Equations** (3) Glick and Staff
Prerequisite: Math 139. (Fall)

153 **Introduction to Numerical Analysis** (3) McDonald
Introduction to fundamentals of numerical analysis using modern digital computers. Solution of linear systems and of ordinary differential equations. Interpolation polynomials. Iterative solution of nonlinear equations. Simple quadrature techniques. Prerequisite: Math 111 or 139, or equivalent. (1972–73 and alternate years—fall)

154 **Difference Equations** (3) McDonald
Introduction to finite differences equations and their solution. Physical examples and analogies with differential equations are employed to motivate and apply the techniques developed. Generating functions. Analysis of error and stability characteristics. Prerequisite: Math 111 or 139, or equivalent. (1972–73 and alternate years—spring)

157 **Introduction to Complex Variable Theory** (3) Henney and Staff
Prerequisite: Math 139. (Spring)

•160 **Introduction to Abstract Algebra for Teachers** (3) Bari and Staff
Basic algebraic structures, such as groups, rings, integral domains, and fields; properties of integers and rational numbers. Prerequisite: Math 31 or equivalent.

•161 **Introduction to Linear Algebra for Teachers** (3) Bari and Staff
Linear functions, solution of equations, quadratic forms, change of basis. Prerequisite: Math 31 or equivalent.

•162 **Introduction to Geometric Theories for Teachers** (3) Bari and Staff
Postulational developments of Euclidean and non-Euclidean geometries. Prerequisite: Math 31 or equivalent.

•163 **Advanced Calculus for Teachers** (3) Bari and Staff
Rigorous re-examination of one-variable calculus, emphasis on limit, continuity, differentiability, Riemann integration. Prerequisite: Math 160 or permission of instructor.

•164 **Foundations of Mathematics for Teachers** (3) Bari and Staff
Logic, set-theory, and foundations of the real number system. Prerequisite: Math 31 or equivalent.

•165 **Introduction to Theory of Numbers for Teachers** (3) Bari and Staff
Selected topics from theory of numbers. Prerequisite: Math 31 or equivalent.

•166 **Introduction to Graph Theory for Teachers** (3) Bari and Staff
Graph theory with applications to matchings, networks, programming, economics, psychology, biology, puzzles. Prerequisite: Math 31 or equivalent.

• Open only to candidates for the degree of Master of Science for Teachers, teachers for in-service training, or students recommended by the Department of Education.

*167 **Introduction to Topology for Teachers** (3) Bari and Staff

Elements of topology with some simple applications. Prerequisite: Math 163 or permission of instructor. (Fall)

*168 **Seminar: Curriculum Studies** (3) Bari and Staff

Critical examination of secondary school mathematics curricula, techniques, and programs. Prerequisite: Math 31 and permission of instructor

*169 **Proseminar in Mathematics for Teachers** (3) Bari and Staff

Topics in mathematics; emphasis on directed individual research. Prerequisite: Math 31 and permission of instructor.

181–82 **Seminar: Applied Mathematics** (3–3) Glick, Liverman

Prerequisite: Math 140, Stat 189–90, some knowledge of linear algebra, senior status as a major in Applied Mathematics. (Academic year)

191 **Special Topics** (arr.) Staff

Admission by permission of instructor. May be repeated for credit. (Fall or spring)

195 **Reading and Research** (arr.) Staff

Under the personal direction of an instructor. Limited to Mathematics and Applied Mathematics majors with demonstrated capacity. Prior approval of instructor required. May be repeated for credit. (Fall or spring)

THIRD GROUP

201–2 **Mathematical Logic** (3–3) Nelson

(1973-74 and alternate years—academic year)

220 **Algebraic Number Theory** (3) Lee

Prerequisite: Math 266. (Spring)

237–38 **Theory of Functions of a Complex Variable** (3–3) Liverman

Prerequisite: Math 140. (Academic year)

239–40 **Ordinary Differential Equations** (3–3) Glick

Prerequisite: Math 123 or 124; 140. (1972-73 and alternate years—academic year)

243–44 **Numerical Analysis** (3–3) McDonald

Elements of theory and practice of numerical analysis using modern digital computers. Solution of linear systems and nonlinear equations. Computation of eigenvalues and eigenvectors. Basic approximation theory. Interpolation techniques. Numerical quadrature. Solution of differential equations. Prerequisite: Math 124, 111 or 139; or equivalent. (1973-74 and alternate years—academic year)

245 **Special Topics in Numerical Mathematics** (3) McDonald

In-depth numerical study of one or more of the following topics: solution of linear or nonlinear systems, eigen-problems, solution of ordinary and partial differential equations, numerical analysis and approximation of functions. Other topics considered, as appropriate. (Fall)

* Open only to candidates for the degree of Master of Science for Teachers, teachers for in-service training, or students recommended by the Department of Education.

247 Numerical Mathematics Laboratory (3) McDonald

Critical analysis of modern computer library routines for standard numerical mathematics. Development of bench-mark problems for validation and evaluation of such library routines. Diagnosis and adjustment of program faults and algorithmic weaknesses. Techniques for determination of computational environment. Development of measures for problem condition characteristics. (Spring)

250 Measure and Integration (3) Taam

Lebesgue measure and integration, measure and integration in abstract spaces, the Daniell integral. Prerequisite: Math 140. (Fall)

251–52 Real and Abstract Analysis (3–3) Henney

Elements of topology; filters, compactness, metric spaces. Continuity and double limits. Banach and Hilbert spaces. Vector to vector functions implicit function theorem. Introduction to generalized function spaces Prerequisite: Math 106, 123, and 140; or equivalent. (1972–73 and alternate years—academic year)

255 Differential Geometry (3) Dr

(1972–73 and alternate years—spring) Ka

257 Lie Algebras (3)

Prerequisite: Math 267. Le

258 Group Representations (3)

Prerequisite: Math 267. Ka

259 Topics in Algebra (3)

Prerequisite: Math 266.

261–62 Principles and Methods of Applied Mathematics (3–3) Liverma

Definition of distributions of Schwartz and Gelfand-Silov. Operational and integral transform methods applied to the existence theory and explicit so lution of ordinary and partial differential equation problems of mathe matical physics. Structure of distributions and ultradistributions. Schwartz kernel theorems Engineering and physics applications. Prerequisite: Math 124, 140, and 157; or permission of instructor. (1973–74 and alternate years—academic year)

Ka

265–66 Modern Algebra (3–3)

Fundamental concepts of theory of groups, rings, and fields; theory of finite fields, extension fields, Galois groups, factorization theory in Gaus sian domains and groups with operators. Prerequisite: Math 123 or equivalent. (Academic year)

Ka

267 Theory of Rings and Algebras (3)

Prerequisite: Math 266. (Fall) Gl

269 Integral Equations (3)

Prerequisite: Math 123 or equivalent; Math 139, 140. Gl

270 Tensor Analysis (3)

Prerequisite: Math 123, 140; some acquaintance with elementary topolo Gl

277 Partial Differential Equations (3)

Prerequisite: Math 140. (1972–73 and alternate years—spring)

281–82 **General Topology** (3–3) **Stone**
(1972–73 and alternate years—academic year)

285–86 **Algebraic Topology** (3–3) **Bari**
(1973–74 and alternate years—academic year)

287–88 **Functional Analysis** (3–3) **Taam**
Fundamental results of functional analysis. Students participate in classroom presentation and discussion. Topics include abstract integration and measure theory, liner topological spaces, Hilbert and Banach spaces, weak topology, Bochner's integral, Banach algebras and application to spectral representation, semi-groups of operators, differential equations in Banach spaces. Prerequisite: Math 238; 250; 106 or 251. (1973–74 and alternate years—academic year)

289–90 **Topics in Functional Analysis and Applications** (3–3) **Taam**
Qualified students encouraged to work with instructor on research projects. Topics selected to serve research interests of instructor and students. Prerequisite: Math 288 or equivalent. (1972–73 and alternate years—academic year)

291–92 **Seminar** (3–3) **Staff**
(Academic year)

295 **Reading and Research** (3) **Staff**
May be repeated once for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) **Staff**
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) **Staff**
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) **Staff**
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Microbiology

Professors Mary Louise Robbins, Rudolph Hugh, M.S. Legator (*Research*), E.M. Lerner II (*Research*), L.F. Affronti (*Acting Chairman*)
Professorial Lecturers F.B. Gordon (*Virology*), Dorothy Heilman (*Cellular Immunology*)
Associate Professors Melvin Reich, Kun-yen Huang
Assistant Professors G.L. Wright, Jr., Yang-Ming Chu, Rosalie De Giovanni-Donnelly (*Research*)

Master of Science in the field of Microbiology.—Prerequisite: a Bachelor's degree with a major in Biology, Botany, Chemistry, or Zoology from this University, or an

equivalent degree. The undergraduate program must have included the following courses or equivalent: B Sc 11–12; Chem 11–12, 51–52, 53–54; Math 30, 31 (31 may be taken concurrently with the graduate program); Phys 1, 2.

Required: the general requirements, pages 93–100. The 30 semester hours of course work must include Micr 201 (if not presented for admission), plus 220, 277–78, 299–300, Epid 230, and Bioc 221–22. The remaining academic work should consist of graduate-level courses selected with the approval of the instructor.

Master of Science in the field of Mycology.—An interdepartmental degree offered by the departments of Biochemistry, Epidemiology and Environmental Health, and Microbiology.

Prerequisite: a Bachelor's degree with a major in Biology, Botany, Chemistry, or Zoology from this University or an equivalent degree. The undergraduate program should have included the following courses, or equivalent: B Sc 11–12; Chem 11–12, 51–52, 53–54.

Required: the general requirements, pages 93–100. Candidates must complete either (1) a minimum of 34 semester hours including Micr 299–300 *Thesis Research*, or (2) a minimum of 40 semester hours without a thesis. The required courses in this program are Bioc 221–22; Epid 201, 217, 230 (2 semester hours); Micr 201, 225, 231.

Doctor of Philosophy in the field of Microbiology.—Required: the general requirements, pages 93–97, 100–102. Candidates must fulfill the tool requirement by passing a reading knowledge examination in French and German or by passing an examination in one of these languages and satisfactorily completing the tool requirement in Biostatistics. The General Examination covers at least four fields, two of which must be in microbiological disciplines.

Research fields: Determinative Bacteriology, Immunochemistry, Immunology, Microbial Genetics, Microbial Pharmacology, Microbial Physiology, and Virology.

Staff

201 Medical Microbiology (6)

Bacteria, rickettsiae, viruses, yeasts, molds, protozoa, metazoa which relate to the health and disease of man—cultural studies, methods of diagnoses, theories. Laboratory fee, $16. (Spring)

Chu

214 Tissue Cell Culture and Somatic Variation (4)

Techniques of tissue culture and means of studying somatic variation. Prerequisite: Micr 201 or equivalent. (Spring)

Robbins

219–20 Scientific Writing for Graduate Students (1–1)

Required of all graduate students prior to writing a thesis or dissertation. (Academic year)

221 Methods of Scientific Presentation for Graduate Students (1) Wright

Photography and graphic arts presentation of research data for publication and scientific meetings. Prerequisite: Micr 219–20. Laboratory fee, $10. (Fall)

225 Microbial Physiology I (3) Affronti, Reid

Morphology and biochemistry of various microorganisms with emphasis on bacteria. Prerequisite: Bioc 221–22, Micr 201. (Fall)

226 Microbial Physiology II (3) Affronti, Reid

Effects of physical and chemical agents on microorganisms with emphasis on antibiotics. Prerequisite: Micr 225 or permission of instructor. (Spring)

230 **Immunology** (4) Wright

Fundamental immunologic concepts. Serologic and immunologic procedures as applied to clinical and research situations emphasized. Prerequisite: Micr 201 or permission of instructor. Laboratory fee, $16. (Fall)

231 **Immunobiology** (2) Wright and Staff

(*Formerly Cellular Immunology*)

Study of immunological functions of reticulo-endothelial tissues, theories of autoimmunity, graft rejection, tumor immunity, delayed hypersensitivities, and immunogenetics. (Fall)

233 **Biology of Viruses** (2) Robbins, Huang

Biochemical and genetic characterization of viruses. Prerequisite: Micr 201 or equivalent. (Fall)

234 **Biology of Viruses—Laboratory** (2) Robbins, Huang

Laboratory complement to Micr 233. Prerequisite or concurrent registration: Micr 233. Laboratory fee, $16. (Fall)

235 **Systematic Bacteriology** (2) Hugh

History of bacterial classification, international rules of nomenclature as applied to bacteria, development of bacterial classification based on relationships, survey of characteristics of bacterial groups. Prerequisite: Micr 201 or equivalent. (1973–74 and alternate years—fall)

251 **Bacteriology** (2) Hugh

Clinical situations involving bacteriology; emphasis on the manner in which infectious agents bring about disease processes. Prerequisite: Micr 201 or equivalent. (Fall)

255 **Virology** (2) Huang, Robbins

General principles of virology; emphasis on clinical situations. Prerequisite: Micr 201 or equivalent. (Fall)

257 **Experimental Immunochemistry** (3) Wright

Biochemical and physiochemical characterization of antigens and antibodies. Prerequisite: Bioc 221–22 or equivalent, Micr 230. Laboratory fee, $16. Limited enrollment. (1973–74 and alternate years—spring)

258 **Microbial Genetics** (2) De Giovanni-Donnelly, Legator

Survey of microbial systems that depict basic concepts of genetic principles. Prerequisite: Micr 201 or equivalent. (Spring)

277–78 **Seminar: Microbiology** (1–1) Staff

Required of graduate students. (Academic year)

293 **Special Topics in Microbiology** (arr.) Staff

Selected topics in microbiology. May be repeated for credit. (Fall and spring)

295 **Research in Microbiology** (arr.) Staff

Content differs each time the course is offered; may be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Music

Professor George Steiner (*Chairman*)
Associate Professors Robert Parris, N.A. Tilkens
Assistant Professorial Lecturers N.O. Scribner, Jr. (*Organ*), Margaret Tolson (*Piano*), J.E. Stephens (*Trumpet*), Nancy Mandel
Studio Lecturers in Applied Music Marian McNabb (*Piano and Organ*), Constance Russell (*Piano*), Malinee Peris (*Piano*), Sura Kim (*Piano*), Ylda Novik (*Piano*), C.O. Dash (*Voice*), Phyllis Gieseler (*Voice*), S.H. Prussing (*Voice*), Jane White (*Voice*), R.A. Norris (*Guitar*), E.C. Johns (*Guitar*), R.C. Raffaelle (*Guitar*), Gretchen Scharf (*Guitar*), J.E. Marlow (*Guitar*), Richard Parnas (*Violin and Viola*), J.S. Martin, Jr. (*Cello*), Dorothy Jarvinen (*Cello*), N.M. Irvine (*Bass*), T.P. Perazzoli (*Flute*), R.O. White (*Oboe*), W.R. Wright (*Clarinet and Saxophone*), Lewis Lipnick (*Bassoon*), S.E. Ramsay (*French Horn*), R.H. Kraft (*Trombone and Recorder*), G.W. Faith Carman (*Harp*), T.H. Wardlow (*Percussion Instruments*), G. Recker (*Trumpet*)

Bachelor of Arts with a major in Music History and Literature, Music Theory, or Applied Music (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88.

2. Prerequisite courses—Mus 5–6, 6 hours of Applied Music lessons, a minimum of 4 semesters in Music Ensemble groups (or evidence of equivalent experience).

3. Required courses in related areas—12 hours of one foreign language (French, German, or Italian recommended).

4. Required courses in the major—Mus 103–4, 131–32; 6 additional hours of Music Theory courses; 6 additional hours of Music History and Literature courses plus 6 hours of courses in the area of the major. (Music Theory majors must meet Departmental requirements for proficiency in piano; Applied Music majors must perform a complete public recital or the equivalent in major solo performances.)

Master of Arts in the field of Musicology.—Prerequisite: a Bachelor's degree with a major in music, or an equivalent degree.

Required: the general requirements, pages 93–100. The program of study consists of (1) 24 semester hours of course work plus a thesis (equivalent to 6 semester hours), or (2) with the approval of the Department, 30 semester hours of course work without a thesis. All degree candidates are required to take 18 semester hours of Music History and Literature or Music Theory courses and 6 hours of Applied Music. The thesis must demonstrate research ability in musicology.

Master of Music in the field of Music Theory, Music Composition, Conducting, or Applied Music.—Prerequisite: a Bachelor's degree with an undergraduate major in one of the following, at this University, or an equivalent degree: (1) Music History and Literature, (2) Music Theory, or (3) Applied Music.

Required: the general requirements, pages 93–100. The 30 semester hours of

ured second- and third-group course work including a thesis (299–300) are as llows:

. *In the field of Music Theory.*—Eighteen semester hours of Music History and erature and Music Theory courses, 6 hours of Applied Music, and a thesis dem-trating research ability in theoretical, creative, or analytical techniques.

2. *In the field of Music Composition.*—Eighteen semester hours of Music History d Literature and Music Theory courses, 6 hours of Applied Music, and a creative sis of one composition in large form properly prepared for performance (chamber sic, a symphonic form, or a choral work with orchestral accompaniment) includ-g a written theoretical, formal, and harmonic analysis of the work.

3. *In the field of Conducting.*—Eighteen semester hours of Music History and Lit-ature and Music Theory courses, 6 hours of Applied Music, and a thesis demon-trating research ability in theoretical, creative, or analytical techniques. The re-uirements also include an acceptable public conducting performance.

4. *In the field of Applied Music.*—Twelve semester hours of Applied Music in the ea of concentration (piano, harpsichord, organ, voice, string or orchestral wood-nd instrument), 12 hours of Music Theory and Music History and Literature urses. The thesis area consists of (1) a public recital or performance before a signated committee—such a recital or performance must be representative of an pressive and well-rounded repertory, performed on a professionally accepted artistic vel including verbal historical and analytical lecture notes on the musical content the program; (2) demonstrated leadership in an ensemble performance (opera oratorio for voice); and (3) a written report on some approved theoretical area lated to the student's concentration.

Bachelor of Arts in Education with a teaching field in Music.—Prerequisite: the ducation curriculum, pages 80–81.

Required: the Music option and professional courses listed on pages 116, 119.

USIC HISTORY AND LITERATURE

IRST GROUP

3 **Introduction to Musical Understanding** (3) Steiner, Tilkens

Introductory history of musical styles, related to listening; elements and materials of music. (Fall and spring)

4 **Survey of Music Literature** (3) Steiner

Introductory study of musical forms, structures, and textures; aural analysis of selected literature. (Spring)

ECOND GROUP

103–4 **History of Music** (3–3) Tilkens

Development of music in the Western World from the early Christian Era to the present. (Academic year)

105 **Music of the Baroque Period** (3) Tilkens

Study of the musical styles, techniques, and literature from 1600 to 1750. (Fall)

106 **Music of the Classic Period** (3) Tilkens

Study of styles, techniques, and literature from the 18th century schools through Haydn, Mozart, and Beethoven. (Spring)

107 Music of the Romantic Period (3)
Study of the musical styles, backgrounds, and literature from Schub through the 19th century. (Spring)

108 Music of the 20th Century (3)
The principal schools, techniques, developments, and trends of the century. (Fall)

109 Orchestra Literature (3)
Survey of the history and styles of orchestra literature, analysis of rep sentative works.

110 Chamber Music Literature (3)
Survey of the history and styles of chamber music literature, analysis representative works.

121 The Opera (3)
Survey of the history and styles of opera, analysis of represent works. (Fall)

125 Keyboard Music Literature (3)
Survey of the history, style, and major content of the keyboard litera from the 16th century to the present.

173 Piano Pedagogy (3)
Principles, materials, and methods of piano teaching. (Spring)

199 Independent Research (3)
Under the guidance of an assigned instructor. Open only to quali Music majors. (Fall and spring)

THIRD GROUP

203 Bibliography and Research Methodology (3)
(Fall)

209 History of Musical Instruments (3)

234 Seminar: Performance Practices in Selected Areas (3)

238 Seminar: Analytical Studies in Music History (3)
(Techniques of 20th century composition—spring)

MUSIC THEORY

FIRST GROUP

1 Elements of Music Theory (3)
Notation, scales, keys, intervals, terms, rhythms, ear-training, sight-sin elementary keyboard harmony, melodic and harmonic dictation. and spring)

5–6 Harmony (3–3)
Triads, inversions; chord analysis, construction, and progression;

writing, modulations, altered chords. Prerequisite: Mus 1 or satisfactory passing of placement examination. (Academic year)

OND GROUP

31–32 **Advanced Theory** (3–3) **Parris**
(*Formerly Advanced Harmony*)
Practice in 18th century contrapuntal writing and analysis, chorale preludes, inventions, and fugues. Prerequisite: Mus 5–6 or equivalent. (Academic year)

135 **Counterpoint** (3) **Parris**
Study and practice of 16th century contrapuntal techniques. (Spring)

137 **Orchestration** (3) **Parris**
Instrumental scoring. (Fall)

138 **Form and Analysis** (3) **Parris**
Analysis of musical forms in representative musical literature. (Fall)

151 **Conducting** (3) **Steiner**
Technique of conducting, score reading, rehearsal procedures, analysis, and interpretation of selected musical literature; practice in conducting. (Spring)

RD GROUP

31–32 **Composition** (3–3) **Parris, Stephens**
May be repeated for credit. (Academic year)

251 **Advanced Conducting** (3) **Steiner**
(Spring)

99–300 **Thesis Research** (3–3) **Staff**
(Fall and spring)

PLIED MUSIC

ll Applied Music courses may be repeated for credit. The supplementary fee is ired for full-time music majors. With the exception of Mus 51, 52, 53, and 54, -semester hour courses are individual lessons of ½ hour a week—supplementary 349; 2-, 3-, or 6-semester hour courses are individual lessons of 1 hour a week pplementary fee, $80. Six-semester hour courses include lessons, supervised en- preparation, and required practice 15 hours a week. Mus 51, 52, 53, and not include individual lessons and carry no supplementary fee.

RST GROUP

hree hours of practice are required for each semester hour.

11 **Piano** (1) **Staff**
(Fall and spring)

12 **Piano** (2) **Staff**
(Fall and spring)

13 **Voice** (1)
(Fall and spring)

14 **Voice** (2)
(Fall and spring)

15 **Organ** (1)
(Fall and spring)

16 **Organ** (2)
(Fall and spring)

17 **Violin** (1)
(Fall and spring)

18 **Violin** (2)
(Fall and spring)

19 **Classical Guitar** (1)
(Fall and spring)

20 **Classical Guitar** (2)
(Fall and spring)

21 **Viola** (1)
(Fall and spring)

22 **Viola** (2)
(Fall and spring)

23 **Cello** (1)
(Fall and spring)

24 **Cello** (2)
(Fall and spring)

25 **Bass** (1)
(Fall and spring)

26 **Bass** (2)
(Fall and spring)

27 **Flute** (1)
(Fall and spring)

28 **Flute** (2)
(Fall and spring)

29 **Recorder** (1)
(Fall and spring)

30 **Recorder** (2)
(Fall and spring)

31 **Oboe** (1)
(Fall and spring)

Prussing, J. Wi

Prussing, J. Wi

Scribner, McN

Scribner, McN

Pa

Pa

Johns, Norris, Raffaelle, Sc

Johns, Norris, Raffaelle, Sc

Pa

Pa

Martin, Jarv

Martin, Jarv

In

In

Perr

Perr

R. W

32 **Oboe** (2) — R. White
(Fall and spring)

33 **Clarinet** (1) — Wright
(Fall and spring)

34 **Clarinet** (2) — Wright
(Fall and spring)

35 **Saxophone** (1) — Wright
(Fall and spring)

36 **Saxophone** (2) — Wright
(Fall and spring)

37 **Bassoon** (1) — Lipnick
(Fall and spring)

38 **Bassoon** (2) — Lipnick
(Fall and spring)

39 **French Horn** (1) — Ramsay
(Fall and spring)

40 **French Horn** (2) — Ramsay
(Fall and spring)

41 **Trumpet** (1) — Stephens
(Fall and spring)

42 **Trumpet** (2) — Stephens
(Fall and spring)

43 **Trombone** (1) — Kraft
(Fall and spring)

44 **Trombone** (2) — Kraft
(Fall and spring)

45 **Percussion** (1) — Wardlow
(Fall and spring)

46 **Percussion** (2) — Wardlow
(Fall and spring)

47 **Harp** (1) — Carman
(Fall and spring)

48 **Harp** (2) — Carman
(Fall and spring)

51 **Orchestra** (1) — Steiner
Preparation and performance of orchestral literature. Prerequisite: audition before Director. (Fall and spring)

52 **Instrumental Ensemble** (2)
Chamber ensemble groups in addition to orchestra participation. and spring)

53 **Chorus** (1)
Preparation and performance of choral literature. Prerequisite: before Director. (Fall and spring)

54 **Chamber Choir** (2)
Small vocal groups in addition to chorus participation. spring)

SECOND GROUP

Prerequisite: audition to meet departmental requirements. Required practice: a week for 1-semester hour courses, 10 hours a week for 2-semester hour 12 hours a week for 3-semester hour courses.

111 **Piano** (1)
(Fall and spring)

*112 **Piano** (2 or 3)
(Fall and spring)

113 **Voice** (1)
(Fall and spring)

*114 **Voice** (2 or 3)
(Fall and spring)

115 **Organ** (1)
(Fall and spring)

*116 **Organ** (2 or 3)
(Fall and spring)

117 **Orchestral Instrument** (1)
(Fall and spring)

*118 **Orchestral Instrument** (2 or 3)
(Fall and spring)

119 **Classical Guitar** (1)
(Fall and spring)

*120 **Classical Guitar** (2 or 3)
(Fall and spring)

THIRD GROUP

211 **Piano** (3)
(Fall and spring)

* Only Music majors may elect 3 semester hours of credit.

212 **Piano** (6)
(Fall and spring)

213 **Voice** (3)
(Fall and spring)

214 **Voice** (6)
(Fall and spring)

215 **Organ** (3)
(Fall and spring)

216 **Organ** (6)
(Fall and spring)

217 **Orchestral Instrument** (3)
(Fall and spring)

218 **Orchestral Instrument** (6)
(Fall and spring)

thology

fessors T.M. Peery (*Chairman*), W.R. Duryee (*Research Emeritus—Ex-rimental*), F.N. Miller, Jr., William Newman, J.C. Smith, A.W. Musser, H. Smith

ical Professors L.E. Zimmerman (*Ophthalmic*), J.M. Blumberg, G.H. tenstein, N.S. Irey, Robert Sauer (*Comparative*), Cornelia Hoch-Ligeti, . Luke

morial Lecturers Mary Matthews, P.D. Olch (*History of Medicine*)

ciate Professor W.L. Marsh, Lois Platt (*Cytology*), Alexander Breslow, S Jannotta, L.S. Lessin (*Hematology*), M.S. Platt, W.A. Burns, R.B. geman

ciate Clinical Professors V.E. Martens, R.E. Palmer, W.J. Jaffurs, M.A. emberger

tant Professors S.G. Kent, Suzanne Hammersberg (*Medical Technology*), C. Zook (*Comparative*), J.G. Guccion

tant Clinical Professors W.F. Enos, Marjorie Williams, C.B. Cook, D.R. kinson, I.D. Godwin, Floris Garner (*Comparative*), Gloria Brennan

ial Lecturers L.C. Johnson, R.S. Chandra

Bachelor of Science in Medical Technology.—Prerequisite: the Medical Technology ...ulum, page 80.

...uired: the general requirements, pages 83–85, 88–89, including B Sc 111 and ...al second-group Biological Sciences courses as recommended, see page 88; ...th 115–16, 117–18, 119–20, offered in the University Hospital.

...ter of Science in the field of Pathology.—Prerequisite: a Doctor of Veteri-... Medicine degree from a school recognized by the American Veterinary Medi-... Association.

...uired: the general requirements, pages 93–100. The program of study consists ... semester hours of course work distributed as follows: (1) Path 201 (8 se-...ter hours), 2 semester hours selected from any basic medical science courses,

Path 283 (four months full-time in hospital-based clerkship for which the stud
receives 15 semester hours of credit); and (2) a thesis (6 semester hours based o
a two-year training period in Veterinary Pathology. This training period may be
taken at either the Armed Forces Institute of Pathology or the Office of Patholog
National Zoological Park, Smithsonian Institution.

Doctor of Philosophy in the field of Pathology.—Prerequisite: one of the follow
ing degrees from a recognized professional school: Doctor of Medicine (M.D.
Doctor of Veterinary Medicine (D.V.M.), or Doctor of Dentistry (D.D.S.).

Required: the general requirements, pages 93–97, 100–102, including 48 semester
hours of approved graduate course work and a minimum of 24 semester hours of
dissertation research. One year of residency in pathology at the University Hospita
equivalent to Path 283, may be counted for a maximum of 24 semester hours
graduate course work. Other experience must satisfy the eligibility requirements
the appropriate national certifying body, i.e., the American Board of Pathology
the case of the M.D., the American Board of Veterinary Pathology in the case
the D.V.M., and the American Board of Oral Pathology in the case of the D.D.

Research fields: Comparative Pathology, Human Pathology, Ophthalmic Path
ology, and Veterinary Pathology.

115–16 **Introduction to Medical Science** (1–1) Marsh, Hammersberg, and Staf

Lectures on physiology, pathology, and medicine to accompany Path 117–
20. For medical technology students only. (Academic year)

117–18 **Principles in Medical Technology** (4–4) Marsh, Hammersberg, and Staf

Theories, principles, sources of error of methods used in clinical chem
istry, clinical bacteriology, serology, hematology, clinical microscop
For medical technology students only. (Academic year)

119–20 **Medical Technology Laboratory** (10–10) Marsh, Hammersberg, and Staf

Rotation through University Hospital pathology laboratories: hematolo
and urinalysis, 12 weeks; chemistry, 16 weeks; bacteriology and parasit
ogy, 12 weeks; blood bank, 6 weeks; serology, 4 weeks. For medi
technology students only. (35 hours a week for 50 weeks)

Staf

*201 **Pathology** (8)

A general introduction to concepts of disease. Pathology of organ sy
tems; correlation with symptoms and physical signs. Gross and micro
scopic study of diseased tissues. Case studies. (Fall)

Zus

†205 **Comparative Pathology I** (3)

An introduction to the study of disease in vertebrates, and comparis
with disease in man. Mechanisms by which various agents provoke di
ness; body defensive reactions. Illustration of common diseases of
ous species, including material from captive wild animals. Recommende
courses in anatomy, histology, and physiology. (Fall)

Dunn

*262 **Problems in Experimental Cellular Pathology** (1)

Cytological and biochemical aspects of cellular function in relation
normal and selected pathological conditions. (Spring)

* Open to limited number of graduate students, with permission.
† An interdepartmental course offered by the departments of Pathology and Biological Sciences.

*266 **Comparative Pathology II** (1) — Sauer, Zook

Participation in an autopsy service involving wild animals in captivity, and comparison of diseases in various animal species with those in man. Limited to 4 students. Path. Lab., Nat'l. Zoological Park. (Fall)

*271 **Tissue Reactions to Drugs** (1) — Irey

Study of the problems involved in recognizing instances of untoward reaction to therapy. Case presentations. (Spring)

*276 **Seminars in Pathology** (2) — Peery and Staff

Conferences on current topics in pathology, conducted by and primarily for residents in pathology. Each student teams up with a resident to prepare and present a seminar on a selected topic. (Spring)

*283 **Anatomical Pathology Clerkship** (5 to 30) — Staff

Necropsy and surgical pathology service. Prerequisite: Path 201. Five semester hours of credit for each 4-week period. Students may receive up to 30 semester hours of credit for 6 months full-time. (Fall or spring)

295 **Comparative Pathology III** (5 to 30) — Garner, Zook, Sauer

Participation in veterinary pathology service, including wild and domestic animals. Prerequisite: Path 201, 283. Path. Lab., Nat'l. Zoological Park, and Armed Forces Inst. of Path. (Fall or spring)

[illegible]-300 **Thesis Research** (3–3) — Staff

(Fall and spring)

398 **Advanced Reading and Research** (arr.) — Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

[illegible]99 **Dissertation Research** (arr.) — Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

[illegible]rmacology

[illegible]*fessors* H.G. Mandel (*Chairman*), V.H. Cohn, Jr., Paul Mazel, S.E. Fabro (*Research*)

[illegible]*fessorial Lecturers* B.B. Brodie, F.E. Hahn

[illegible]*ociate Professors* K.S. Kim (*Research*), W.R. Jondorf (*Research*), J.A. Straw

[illegible]*tant Professors* Philip Klubes, Barbara Roth-Schechter

[illegible]*cial Lecturer* P.J. Creaven

Master of Science in the field of Pharmacology.—Prerequisite: a Bachelor of Arts [illegible] Bachelor of Science degree. The undergraduate program must have included the [illegible]owing courses, or equivalent: B Sc 11–12; Phys 1, 2; Chem 11–12, 22, 51–52, [illegible]54. One year of calculus and a course in physical chemistry are normally rec[illegible]mended but may be taken during the work toward the Master's degree.

[illegible]equired: the general requirements, pages 93–100, including Bioc 221–22; Phyl

*Open to limited number of graduate students, with permission.

201; Phar 201, 299–300. The remaining courses may be selected from Bioc 224, 227, 232, 241, 252, 260, 266; Chem 156, 251–52, 257; Micr 201, 225, 226, 230, 23[illegible] 257, 258; Phar 254, 256, 267, 269, 272, 275–76, 277–78, 279, 281, 282, 283, 295

Doctor of Philosophy in the field of Pharmacology.—Required: the general re[illegible] quirements, pages 93–97, 100–102.

Research fields: Biochemical Pharmacology, Chemotherapy and Molecular Pha[illegible] macology, Developmental Pharmacology, and Physiological Disposition of Drugs.

115 Drug Abuse Education (3) Cohn and Staf[illegible]

Offered off campus through the College of General Studies. Psychological and sociological bases of drug abuse, pharmacological and toxicological aspects of drug action on both the brain and peripheral organ systems, legal and societal implications of and reactions to drug abuse. Lectures and discussions on alcohol, narcotics, central nervous system stimulants and depressants, marijuana and other hallucinogenic and psychedelic drugs. (Fall and spring)

201 Pharmacology (8) Mandel and Staf[illegible]

Lectures, laboratory, conferences on interaction of drugs and biological systems as a basis for rational therapy of disease. Prerequisite: biochemistry and physiology, or approval of Department. (Fall) Staf[illegible]

203 Fundamental Principles of Pharmacology (2)

Basic principles of pharmacology, including drug receptor interactions, structure activity relationships, pharmacokinetics, membrane phenomena, cellular control mechanisms, drug toxicity. (Fall)

215 Adolescent Drug Abuse: a Program for Educators (3) Cohn and Staf[illegible]

Offered off campus through the College of General Studies. Primarily for school teachers, counselors, and administrators. Multidisciplinary lectures and discussions concerning the physiological and psychological effects of narcotics, central nervous system stimulants and depressants, alcohol, and hallucinogenic and psychedelic drugs; psychosocial factors leading to adolescent drug abuse; legal implications of drug abuse; prevention, control, and treatment of drug abuse. (Fall and spring) Staf[illegible]

252 Seminar: Clinical Pharmacology (2)

Problems in therapeutics; emphasis on drugs used in treatment of cancer, vascular and infectious diseases. Enrollment limited. (1973–74 and alternate years—spring)

254 Frontiers in Pharmacology (1) Mandel and Staf[illegible]

Recent advances and fields of research in pharmacology. Presented by laboratory scientists from neighboring institutions. (Spring) Staf[illegible]

256 Molecular Pharmacology (2)

Current theory on action of drugs, especially chemotherapeutic agents, at molecular level. Effect of drugs on biosynthetic processes of the cell with respect to DNA, messenger RNA, transfer RNA, ribosomes, protein, cell wall, and intermediary metabolites. Factors which alter action of drugs such as drug interactions and resistance. (Spring)

258 Cancer Chemotherapy (1) Mandel and Staf[illegible]

Mechanisms by which drugs inhibit the growth of tumor cells. (1973–74 and alternate years—spring)

259 **Developmental Pharmacology** (1) Fabro

Lectures, seminars, conferences. Teratogenic actions of drugs; pharmacological principles which apply during prenatal and perinatal development. (1973–74 and alternate years—spring)

260 **Endocrine Pharmacology** (1) Kim

Lectures and seminars on recent advances in the pharmacology and mechanism of action of various hormones. (1972–73 and alternate years—spring)

267 **Pharmacological Research** (arr.) Staff

Research with staff members. May be repeated once for credit toward a Master of Science degree. (Fall and spring)

269 **Pharmacology Seminar** (1) Staff

Recent advances in pharmacology. Content differs each time the course is offered; may be repeated once for credit. (Fall and spring)

272 **Physiological Disposition of Drugs** (3) Cohn

Fate of drugs in biological tissue. Absorption, distribution, chemical alteration, excretion of drugs; physical, chemical, and biological factors affecting these processes. Limited to 20 students. Prerequisite: Phar 201. (1973–74 and alternate years—spring)

5–76 **Advanced Topics in Pharmacology I–II** (1–1) Staff

Lectures and seminars on advances in mechanisms of drug action, pharmacology of new drugs, theoretical aspects of pharmacology, laboratory techniques. (1973–74 and alternate years—academic year)

–78 **Advanced Topics in Pharmacology III–IV** (1–1) Staff

Continuation of Phar 275–76. (1972–73 and alternate years—academic year)

279 **Special Topics in Pharmacology** (arr.) Staff

Selected aspects of drug action. Content differs each time the course is offered; may be repeated once for credit. (Fall and spring)

281 **Physiological Techniques in Pharmacology—Lecture** (2) Mazel, Straw

Physiological techniques for obtaining information on mechanism and site of action of pharmacological agents. Limited to 20 students. Phar 281 may be taken without 282. Prerequisite: Phar 201. (1973–74 and alternate years—spring)

82 **Physiological Techniques in Pharmacology—Laboratory** (2) Mazel, Straw

Accompanies Phar 281. Prerequisite: Phar 201. Prerequisite or concurrent registration: Phar 281. (1973–74 and alternate years—spring)

83 **Biochemical Techniques in Pharmacology** (arr.) Cohn

Lectures and laboratory. Theory and practice of modern biochemical techniques applicable to study of metabolic fate and mechanism of action of drugs. Prerequisite: Phar 201. (As arranged)

295 **Reading and Research** (arr.) Staff
Independent study for students preparing for the Master of Science degree. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Philosophy

Professors Thelma Z. Lavine (*Chairman*), R.H. Schlagel
Associate Professors C.H. Pfuntner, W.B. Griffith
Associate Professorial Lecturer Laura Schrenk
Assistant Professor Gerald Donaldson

Bachelor of Arts with a major in Philosophy (Departmental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirements for "meaningful initiation" into the Social Studies and the Natural and Mathematical Sciences.)

2. Required courses in related areas—6 semester hours of literature courses selected from Chinese, Classics, English, French, German, Italian, Slavic, or Spanish (Clas 71–72 or Engl 91–92 recommended); 6 hours selected from Art History and Theory, Music History and Literature, or Religion.

3. Required courses in the major—Phil 111, 112, 113; 9 semester hours selected from Phil 121, 131, 151, 152; 6 semester hours selected from Phil 172, 192, 194, plus 6 additional semester hours of second-group Philosophy courses.

For students expecting to continue in graduate school, it is recommended that they include in their program of study 12 semester hours of introductory French, German, or Greek language courses.

Master of Arts in the field of Philosophy.—Prerequisite: a Bachelor's degree with an undergraduate major in Philosophy at this University, or an equivalent degree. The undergraduate program should have included the following courses or their equivalent: Phil 111, 112, 113, 121, 131, and 152.

Required: the general requirements, pages 93–100. The program of study consists of a minimum of 30 semester hours of second- and third-group courses with or without a thesis. A Master's Comprehensive Examination is required in two areas of philosophy: the History of Philosophy; Problems of Philosophy and Contemporary Philosophy.

FIRST GROUP

50 **Introduction to Philosophy** (3) Staff
(Replaces former Phil 61–62 Introduction to Philosophy (3–3))
Readings from major philosophers and of philosophic positions from Plato to the present. (Fall and spring)

71 Philosophy and Literature (3) — Lavine

Philosophical foundations of psychoanalytical psychiatry, existentialism, and Marxism and their expression in literature, e.g., in the works of Mann, Kafka, Camus, Sartre, Hesse, and Koestler. (Spring)

ECOND GROUP

111 History of Ancient Philosophy (3) — Donaldson

History of Western philosophy from early Greece to the early Middle Ages. (Fall and spring)

112 History of Modern Philosophy (3) — Pfuntner

History of Western philosophy of the 17th and 18th centuries (Descartes to Kant). (Spring)

113 19th Century Philosophy (3) — Lavine

European philosophy from Kant to Nietzsche. (Fall)

121 Introduction to Symbolic Logic (3) — Griffith

Systematic study of the principles of valid inference with attention to the development of skill in logical analysis and evaluation of arguments, and to the elementary theory of formal systems. (Fall)

***127 Theories of History (3)** — Lavine

Critiques of philosophies of history: idea of progress, historicism, Hegelian-Marxian dialectic, cyclical and social-scientific views. Contemporary problems of historical knowledge. (Fall)

131 Ethics (3) — Griffith

Theories of "the good" and "the right" from Plato to Sartre. (Spring)

132 Social Philosophy (3) — Lavine

Social philosophies from Luther to Marxism and Fascism. (Spring)

142 Philosophy of Law (3) — Donaldson

Systematic examination of the fundamental concepts of law and jurisprudence; special emphasis on their treatment by contemporary philosophers and jurists. (Spring)

151 Myth, Science, and the Modern Mind (3) — Schlagel

Comparison of the mythical and scientific outlook; emphasis on the development and nature of scientific concepts, methodology, and explanation from Copernicus to Einstein. (Fall)

152 Knowledge, Truth, and Reality (3) — Schlagel

Inquiry into the basis and structure of knowledge, the problem of perception and independent reality, and the meaning and criteria of truth. (Spring)

162 Aesthetics (3) — Pfuntner

Nature of aesthetic experience, problems of appreciation and criticism in the arts, and theories of artistic creation. Emphasis on contemporary arts and criticism. (Spring)

*Interdepartmental course offered by the departments of Philosophy and History.

172 **American Philosophy** (3) Pfuntner
Philosophies of Peirce, Royce, James, Dewey, and Santayana as representatives of American thought. (Fall)

192 **Contemporary Philosophy: Analytical** (3) Schlagel
The two dominant movements of recent Anglo-American philosophy, logical positivism and British ordinary language philosophy, as represented by Russell, G. E. Moore, Wittgenstein, Ryle, Ayer, etc. (Fall)

193 **Contemporary Philosophy: Phenomenological** (3) Griffith
The phenomenological movement, including its development into German and French existentialism, and its more recent phases. (Fall)

THIRD GROUP

201–2 **Readings and Research** (3–3) Staff
Advanced readings and reports. Investigation of special problems. (Academic year)

210 **Seminar: Ancient Philosophy** (3) Donaldson
Content differs each time course is offered; may be repeated for credit. (A study of the major works of Aristotle—fall)

216 **Seminar: Kant** (3) Schlagel
Critique of Pure Reason. (1972–73 and alternate years—spring)

221 **Seminar: Logical Theory** (3) Griffith
Metatheory of deductive systems, modal logics; historical and philosophical import of recent developments. (1972–73 and alternate years—spring)

231 **Seminar: Ethical Theory** (3) Griffith
Readings in recent ethical philosophy. (Spring)

251 **Seminar: Philosophy of Science** (3) Schlagel
Intensive study of selected problems in the historical and theoretical foundations of science. (Spring)

252 **Seminar: Epistemology** (3) Schlagel
Study of selected problems.

262 **Seminar: Aesthetics** (3) Pfuntner
Study of selected problems.

272 **Seminar: American Philosophy** (3) Pfuntner
Important American contributions to theories of the self, society, and history. (Fall)

280 **Seminar: Philosophy of History** (3) Lavin
Current issues concerning the problems of historical knowledge.

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

ysical Education, Health, and Recreation

fessors Elizabeth Burtner (*Emeritus*), R.G. Hanken, V.J. DeAngelis, Loretta Stallings, J.L. Breen (*Chairman*), Donald Hawkins (*Research*)
fessorial Lecturers W.D. Thompson, Margie Hanson, J.P. Naughton
ociate Professors Lyndale George, Jeanne Snodgrass, Maida Withers
ociate Professorial Lecturers Evelyn DeBoeck, Betty Flinchum, Mike Millan
istant Professors Honey Nashman, Nancy Johnson
istant Professorial Lecturers Barbara Katz, S.G. Pitts
turer Calva Collier

Programs of study leading to the degrees of *Bachelor of Science in Physical Edu-* ion (opportunity for specialization in elementary and secondary school physical cation or dance), *Master of Arts in Education* (field in Physical Education with portunity for specialization in dance, elementary and secondary school physical cation, driver safety education, or special physical education) are offered by School of Education (see pages 105–30).

This Department includes all the recognized sport and dance activities of University dents except intercollegiate athletics for men.

Four semester hours of first-group Physical Education, Health, and Recreation rses are required for Bachelor's degree candidates in the School of Government Business Administration and from 3 to 4 hours are required for Bachelor's degree didates in the education and physical education curriculum in Columbian College Arts and Sciences.

A medical examination is required before participation in physical education ac- ties.

The University is not responsible for injuries received in intramural games or in of the activities of the Department of Physical Education, Health, and Recrea- , and the student assumes full responsibility therefor.

RST GROUP

rses numbered from 1 to 49 are beginning activities courses and require a mini- m of 24 clock hours of instruction.

Courses numbered from 50 to 100 are for students who wish in-depth training a particular activity. They require a minimum of 48 clock hours of instruction.

A physical education activities fee of $4.50 a semester is required for registration one or more of the activity courses (numbered 1 to 100).

Students whose medical examinations indicate the desirability for remedial or rected activity are assigned to programs especially adapted to their needs.

All first-group courses except PE 26 are offered both in the fall and spring semester.

10 **Beginning Badminton** (1)	**Breen**
11 **Beginning Bowling** (1)	**DeAngelis**
12 **Introduction to Ballet** (1)	**Johnson**
13 **Beginning Ballet Technique** (1)	**Johnson**
14 **Intermediate Ballet Technique** (1)	**Staff**
15 **Intermediate/Advanced Ballet Technique** (1)	**Johnson**
16 **Introduction to Modern Dance** (1)	**Withers**
17 **Beginning Modern Dance Technique** (1)	**Withers**

18 **Intermediate Modern Dance Technique** (1) Staf

19 **Folk Dance** (1) Johnson

20 **Beginning/Intermediate Golf** (1) DeAngelis

21 **Foil Fencing** (1) Snodgrass

22 **Basketball** (1) (men only) Hanke

23 **Touch Football** (1) (men only) Hanke

24 **Volleyball** (1) Hanke

25 **Softball** (1) Georg

26 **Karate (Korean Style)** (1) Staf

27 **Beginning Tennis** (1) Georg

28 **Intermediate Karate (Korean Style)** (1) Staf

29 **Yoga** (1) Staf

50 **League Bowling** (2) DeAngel

Emphasis on competitive bowling as a lifetime sport. Staf

51 **Gymnastics** (2)

Emphasis on apparatus and trampoline. Withe

52 **Intermediate/Advanced Modern Dance Technique** (2)

Admission by permission of instructor. Staf

53 **Advanced Modern Dance Technique** (2)

(Formerly PE 57 Dance Technique I (1)) Georg

54 **Intermediate/Advanced Tennis** (2)

Development of skills, theories of strategy; emphasis on competitive play as a lifetime sport. Georg

56 **Application of Recreational Skills to Urban Living** (2)

Recreational activities planned, using urban resources including readi and participation in activities, e.g., bicycling, hiking, jogging, and lifetim sports. Brow

57 **Intermediate/Advanced Badminton** (2)

SECOND GROUP Snodgra

101 **Physical Education in the Elementary School** (3)

For Elementary Education and Physical Education majors. Child grow and development related to school and playground programs in rel ment. Philosophy, curriculum, techniques of teaching, and equipm evaluation. (Fall) Snodgra

102 **Movement Education** (3)

(Formerly Physical Education Curriculum in the Elementary School)

Technique of teaching movement education with emphasis on proble solving methods for kindergarten and grades 1-6. Prerequisite: PE or permission of instructor. (Spring)

103 **Professional Foundations and Concepts of Physical Education, Dance, Recreation, Health, and Athletics** (3) — Staff

Orientation of professional competencies; basic philosophy as it relates to the school, recreation agencies, and professional associations. (Fall)

105 **Adapted Physical Education** (3) — Nashman

(Formerly Special Physical Education)

Corrective, developmental activities for the handicapped—orthopaedic, neurological, cardiovascular, and mentally retarded. Clinical experience. (Spring)

107 **Teaching Ethnic Dance** (2) — Johnson

Methods and materials for teaching the folk and social forms of dance. (Fall)

108 **Dance Improvisation** (2) — Withers

Awareness of body movements, environment, group dynamics, performance, and composition through improvisational technique. (Fall and spring)

9–10 **Dance Composition** (3–3) — Withers

PE 109: basic elements and principles of composition. PE 110: advanced problems in composition. (Academic year)

1–12 **Sports Education Technique** (3–3) — Staff

Techniques for teaching individual, dual, and team sports. (Academic year)

3–14 **Field Experience: Practicum in Physical Education** (3–3) — Staff

Pre-practice teaching in elementary or secondary school physical education and adapted physical education. Seminars relating to field experiences. (Academic year)

117 **Teaching Modern Dance** (3) — Johnson

Methods of teaching modern dance: technique, improvisation, and composition. Analysis of accompaniment. Admission by permission of instructor. (1972-73 and alternate years—fall)

119 **Creative Dance for Children** (3) — Withers

Study of dance as an expressive medium for children; emphasis on concepts and principles, methods and materials. Consideration given to dance for children with special education problems. (Spring)

120 **Repertory** (1) — Withers

Study and performance of dance works. Admission by permission of instructor. May be repeated three times for credit. (Fall and spring)

121 **Dance Technique I** (1) — Withers

(Formerly PE 58 Dance Technique II)

Intermediate/advanced modern dance. May be repeated once for credit. (Fall and spring)

122 **Methods and Materials for Health Education** (3) — Flinchum

Curriculum planning and organization, methodology, selection and use of materials, evaluation, basic health knowledge. (Spring)

123 **Dance Technique II** (2)
(Formerly Advanced Dance Techniques (1 or 2))
Advanced modern dance. May be repeated once for credit. (Fall and spring)

129 **Introduction to Motor Learning** (3)
(Formerly Perceptual and Conceptual Learning)
Theories of motor development and learning; variables of motor performance and learning; implications for teaching movement skills.

130 **Motor Performance in Childhood** (3)
Study of the evolvement and refinement of fundamental movement skills. (1973-74 and alternate years—spring)

134 **Rhythmic Analysis through Creative Movement** (3)
Pulse, meter, phrase, simple music notation, and analysis of elementary terms of music composition. Sensory and ideational stimuli; music, poetry, and the visual arts as motivation for improvisation and choreography. Prerequisite: Mus 3, one semester of modern dance or ballet; or equivalent. (Spring)

135–36 **Survey of Dance History** (3–3)
Dance from primitive ritual to contemporary folk, art, and ethnic forms. Practical work in dance included. PE 135: prehistoric to 20th century. PE 136: 20th century. (1972-73 and alternate years—academic year)

137 **Dance Notation** (3)
Theories and notation systems of Rudolf Laban and their application in the field of dance. (1972-73 and alternate years—fall)

138 **Physical Education Curriculum and Administration** (3)
(Formerly History, Principles, Organization, and Administration of Physical Education)
Curriculum and administration in physical education. Professional ethics. (Fall)

139 **Teacher Behavior** (2)
Teacher behavior analyzed in relation to motives, attitudes, and expectations. Integration of structure, psychological processes, and behavior emphasized for a more thorough understanding of the adjustment processes. (Spring)

141–42 **Dance Production** (2–2)
Theories and practicum in technical aspects of production. PE 141: lighting, sound, and media. PE 142: theatre management, costuming. (1972–73 and alternate years—academic year)

144 **Choreography** (2)
Solo and group. (Fall and spring)

150 **Human Anatomy** (3)
(This course, together with PE 151, replaces former PE 149 Anatomy and Kinesiology (4))
Systematic study of the structure of the human body; emphasis on muscular mechanisms, cardiovascular and respiratory system, and neuro-anatomy.

151 **Kinesiology** (3) Staff
(This course, together with PE 150, replaces former PE 149 Anatomy and Kinesiology (4))
Analysis of human movement including mechanical physics, anatomy, and physiology. Prerequisite: approved course in anatomy. (Spring)

152 **Environment, Leisure, and Quality of Life** (3) Hawkins
(Formerly PE 242)
Environmental problems in and ecological planning for an urban society; their impact on man's total physical and cultural development. (Spring)

157 **Dance Technique and Theory** (2) Withers
Theories of movement; analysis and practice of contemporary dance techniques. Individual application. (Fall)

158 **Safety Education** (3) Millan
Liability, prevention, and emergency care of all types of injuries with reference to first aid and athletics. Proper use of personnel, facilities, and equipment. (Fall)

162 **Driver and Safety Education I** (3) Pitts
(Formerly PE 262 Driver and Safety Education II)
Methods and techniques of conducting programs in driver education. Utilization of multiple car and simulator approaches to instruction. (Spring)

164 **Physiology of Exercise** (3) Staff
The physiological functions of the body and the effect of exercise on these functions. Prerequisite: PE 150 or permission of instructor. (Spring)

180 **Application of Movement Education to Sports** (1)

181 **Analysis of Basic Movements for Children** (1)

182 **Movement Education for Young Children** (1)

RD GROUP

201 **Philosophy and Organization of Physical Education** (3) Breen, Stallings
Concepts of philosophy and philosophic method applied to objectives, principles, and practice in physical education. (Fall)

202 **Conceptual Basis of Motor Learning** (3) Stallings
(Formerly Motor Learning)
Theories of learning and application to development of motor skills; motor theories of perceptual and conceptual learning. (Spring)

211 **Problems and Modern Trends in Physical Education** (3) Breen
Lecture (2 hours), conference (1 hour). For experienced teachers. Organization, supervision, and curriculum problems growing out of current issues; program planning policies; competition.

220 **Problems in Health Education** (3) Staff
Lecture (2 hours), conference (1 hour). Health needs, policies and pro-

gram planning, use of community resources, promising practices in the field. (Fall) Staf

230 **Movement Analysis** (3)
Scientific analysis of fundamental movement and sports skills. (1973-74 and alternate years—fall)

232 **Current Issues in Elementary School Physical Education** (3) Hanson
Current philosophy, trends, and research; implications for curriculum, instruction, evaluation. (Spring)

234 **Organization and Administration of Elementary School Physical Education** (3) Hanson
For school administrators, supervisors, principals, and physical education specialists. Curriculum, administrative, and supervisory problems; kindergarten, grades 1-6. (Spring)

239 **Urban Recreation for Special Groups** (3) Hawkins
Development of recreation for the disabled, impaired, and handicapped using the Baltimore-Washington area as the urban problem setting; development of competencies in community organization, communication, consultation, group dynamics, and interpersonal relations; program development and evaluation. (Spring) Staf

244 **Therapeutic Recreation Practice** (3)
Professional competencies for delivery of services to the handicapped, disabled, impaired; public and private setting for service delivery; client assessment and counseling techniques; basic special education, medical and rehabilitation terminology; etiology of handicapping conditions as related to recreation. (Fall) Thompson

250 **Administration of Urban Leisure Services** (3)
(Formerly Recreation and Outdoor Education)
Planning and organization of a comprehensive system of urban leisure services utilizing educational, cultural, and recreational resources; emphasis on public relations, personnel administration and supervision, systems analysis, fiscal management and managerial accountability. (Fall) Naughton

256 **Sports Medicine and Rehabilitation** (3)
(Formerly Sports Medicine)
Theory and practice of therapeutic exercise and recreation as applied to the rehabilitation of the handicapped; injuries; preventive, adapted and remedial concepts; research in area of general rehabilitation practice and professional roles as related to ancillary medical focus. (Spring) Staf

270 **Philosophy of Dance** (3) (1972-73 and alternate years—fall) Kelly

271 **Dance Notation I** (3)
Study and reconstruction of dance from dance literature; application of notation to dance curriculum; may lead to intermediate certification. Prerequisite: PE 137. (1973-74 and alternate years—fall)

272 **Dance Notation II** (3) **Katz**

Designed to meet individual interest and needs of the student at intermediate/advanced level of notation. Focuses on projects in notation and reconstructing dance works. Prerequisite: PE 271. (1973-74 and alternate years—spring)

273 **Advanced Choreography** (3) **Staff**

Advanced problems in creative movement and composition. Choreographing of group and solo works in dance. May be repeated once for credit. (Fall and spring)

277 **Dance Expressions in Selected Cultures** (3 or 6) **Staff**

Study of ethnic forms of dance through reading and participation. Study may be done in the United States or the country of the dance being studied. (Fall and spring)

297 **Advanced Practicum and Topical Studies** (3 or 6) **Staff**
(Formerly Advanced Topical Studies (3))

Independent study pertinent to the needs of the student and/or field experience related to functional analysis of professional practice and job performance competencies. Prerequisite: Educ 295 or permission of instructor. May be repeated once for credit with permission of the adviser. (Fall and spring)

ical Science

Chemistry."

ics

sors G.M. Koehl, H.H. Hobbs, Julian Eisenstein (*Chairman*), Otto gmann, A.J. Zuchelli, Francisco Prats

ant *Professors* Margaret Montzka, J.M. Harrison, N.K. Khatcheressian, C. Parke, M.F. Taragin, D.R. Lehman, D.D. Thornton

helor of Arts or *Bachelor of Science with a major in Physics (Depart-*
—The following requirements must be fulfilled:
The general requirements as stated on pages 78, 83–88.
Prerequisite courses—Phys 1, 2, 31–32, 51–52; Chem 11–12; Math 31, 32, 33.
Required courses in related areas—(a) 6 semester hours selected from Math
2, 124, 134, 139, 140, 142; (b) Stat 97 or EE 51.
Required courses in the major—Phys 151 or 152, 161, 165; 12 additional
er hours of second-group Physics courses, to be selected with the approval of
partmental adviser.

er of Arts in the field of Physics.—Prerequisite: a Bachelor's degree with a
in Physics at this University, or an equivalent degree.
ired: the general requirements, pages 93–100, including Phys 231, 232, 233–
, 236, 299–300, plus *one* of the following: Phys 241, 242, 243, 244, 245,
-52.

or of Philosophy in the field of Physics.—Required: the general requirements,
3–97, 100–102.

Research fields: Experimental Solid State Physics (Electrical Conductivity of Solids, Defects in Crystals, Magnetic Properties of Solids at Low Temperatures, Mössbauer Effect), and Theoretical Physics (Elementary Particles, Field Theory, General Relativity, Magnetic and Optical Properties of Solids, Molecular Structure, Nuclear Scattering, Quantum Mechanics).

Doctor of Philosophy in the field of Biophysics (an interdepartmental field offered by the departments of Biological Sciences, Physics, and Physiology, see page 232. See pages 93–97, 100–102, for requirements for the degree.

Bachelor of Arts in Education with a teaching field in Physics.—Prerequisite: the Education curriculum, pages 80–81.

Required: the Physics option and the professional courses listed on pages 116, 119

Departmental prerequisite: Phys 31–32 or equivalent, and consent of a Departmental adviser, are prerequisite to all second-group courses in Physics.

ASTRONOMY

FIRST GROUP

9–10 Introduction to Astronomy (3–3)

Lecture (2 hours), recitation (1 hour), laboratory (2 hours). Classical through modern astronomy with introduction to basic principles underlying astronomical systems and observations. Primarily for nonscience majors. Laboratory fee, $11 a semester. (Academic year)

***11–12 Introduction to Astronomy** (2–2)

Same as Phys 9–10 without the laboratory. (Academic year)

PHYSICS

FIRST GROUP

1 General Physics (4)

Topics in classical physics which form a foundation for modern physics. Prerequisite: two years of college preparatory mathematics or concurrent registration for Math 6. Laboratory fee, $11. (Fall and spring)

2 Introduction to Modern Physics (4)

Selected topics in modern physics, including relativity and quantum theory. Prerequisite: Phys 1 or equivalent. Laboratory fee, $11. (Fall and spring)

†3 General Physics (3)

Same as Phys 1 without laboratory. (Fall and spring)

‡4 Introduction to Modern Physics (3)

Same as Phys 2 without laboratory. (Fall and spring)

* This course may not be taken by students who have completed, or are enrolled in, or plan to enroll in Phys 9-10.

† This course may not be taken by students who have completed, or are enrolled in, or plan to enroll in Phys 1.

‡ This course may not be taken by students who have completed, or are enrolled in, or plan to enroll in Phys 2.

5 Topics in Contemporary Physics (3) **Staff**

Discussion of current developments based on recent *Scientific American* articles in the physical sciences. Topics include relativity, quantum theory, elementary particles, lasers, Mössbauer effect, etc. Prerequisite: high school physics and two years of college preparatory mathematics. (Fall)

6 Energy and Entropy: from Lightning to Thermonuclear Power (3)

The energy concept; energy conservation and power production. The entropy concept; its relation to disorder and information. Thermonuclear reactions and their potential use as an energy source. Prerequisite: high school algebra. (Fall)

7 Ideas of Physics—History and Analysis (3) **Staff**

The development of atomic theory and corresponding views of space and time are discussed. Physical phenomena which were relevant to the evolution of the atomic theory are treated in historical perspective. Prerequisite: high school algebra. (Spring)

31–32 Introduction to Theoretical Physics (2–2) **Staff**

Theoretical structure of physics, emphasis on appropriate analytical techniques. Prerequisite: two semesters of calculus and Phys 2. (Academic year)

51–52 Introduction to Experimental Physics (2–2) **Staff**

Experiments and lectures on the basic phenomena of physics and techniques of experimentation. Prerequisite: Phys 2 and two semesters of calculus. Laboratory fee, $11 a semester. (Academic year)

OND GROUP

51–52 Intermediate Laboratory (2–2) **Staff**

Independent advanced work to introduce students to laboratory and shop techniques and the use of specialized instruments. Prerequisite: Phys 51–52. Laboratory fee, $11 a semester. (Academic year)

161 Mechanics I (3) **Staff**

Mechanics of mass points and rigid bodies. Newton's laws, conservation laws, Euler's equations, inertia tensor, small vibrations, and elements of Lagrange's and Hamilton's equations. (Fall)

162 Mechanics II (3) **Staff**

Basic aspects of elasticity and fluid dynamics, strain tensor, stress tensor, equations of equilibrium, elastic waves, ideal and viscous fluids. (Spring)

163 Physical and Quantum Optics (3) **Staff**

(Formerly Optics)

Oscillations and waves, energy and momentum of the electromagnetic field, interference, diffraction, geometrical optics, optics of crystals and other media, dispersion. (Fall)

164 Thermodynamics (3) **Staff**

Basic principles of thermodynamics, reversible changes, applications to simple systems, thermodynamic potentials, phase equilibrium. (Spring)

165–66 **Electromagnetic Theory** (3–3)

Development of Maxwell's field equations using vector and tensor calc... lus, electrostatics, stationary and nonstationary phenomena, basic circu... theory, electromagnetic waves and radiation. (Academic year)

167 **Principles of Quantum Physics** (3)

Experimental background and theoretical basis of quantum mechanics (Fall)

168 **Applied Quantum Physics** (3)

Applications of quantum mechanics to statistical mechanics and to atomic molecular, and nuclear physics. (Spring)

170 **Elementary Solid State Physics** (3)

Dielectric and magnetic properties of solids, behavior of electrons metals and semi-conductors, lattice defects. (Spring)

175 **Nuclear Physics** (3)

Structure and stability of atomic nuclei, nuclear transformations and r... actions, radiations of nuclei, fission. (1972–73 and alternate years— fall)

THIRD GROUP

Consent of a departmental graduate adviser is required for admission to all third group courses in Physics.

231 **Electromagnetic Theory: Macroscopic Effects** (3)

Static boundary value problems, multipoles, dielectrics, and macroscopic media, time-varying fields, plane electromagnetic waves. (Fall)

232 **Advanced Mechanics** (3)

Analytic methods of mechanics as a basis for modern theory: variational principles, Lagrange's equations, Hamiltonian formulation, canonical transformations, classical perturbation theory, transition to continuum (Fall)

233–34 **Quantum Mechanics** (3–3)

General aspects of quantum mechanics with emphasis upon the developmental principles involved. Operators, representations and transformation theory, Schrodinger and Heisenberg pictures, angular momentum, perturbation theory, scattering theory. (Academic year)

235 **Special Relativity** (3)

Application of relativistic concepts to the basic fields of physics: space and time, tensors and covariant mechanics of point particles, covariant form of electromagnetism, relativistic variational principles, relativistic quantum equations. (1973–74 and alternate years—fall)

236 **Electromagnetic Theory: Electrodynamics and Radiative Effects** (3)

Wave guides, resonant cavities, simple radiating systems, covariant methods, radiation by moving charges, multipole fields, radiation damping. (Spring)

241 **Statistical Mechanics** (3) **Staff**

Study of atomic configurations under thermodynamic conditions by use of partition functions and cluster expansion techniques; ideal and non-ideal gases; electron plasmas; changes of state. (Spring)

242 **Atomic and Molecular Structure** (3) **Staff**

Structure of atoms and molecules, energy levels, binding energy, optical activity. Hartree and Hartree-Fock equations, spin-effects, rotational and vibrational effects, paramagnetic resonance, chemical binding. (1972–73 and alternate years—spring)

243 **Solid State Physics: Structure and Binding** (3) **Staff**

Atomic structure of solids and analysis of the binding of crystals. Crystalline forms and symmetries, atomic vibrations and specific heats, sound and optical propagation, crystalline defects. (1973–74 and alternate years—fall)

244 **Solid State Physics: Electronic Processes in Metals** (3) **Staff**

Phenomena in metals and semi-conductors determined by the electronic states allowed: binding, specific heats, magnetic properties, transport phenomena. Independent particle approximation and many-body aspects are discussed. (1973–74 and alternate years—spring)

245 **Quantum Electrodynamics: Theory and Applications** (3) **Staff**

A presentation of the lower order effects depending upon the quantal nature of the electromagnetic field: Hamiltonian formulation and field quantization, perturbation calculations, Compton effect, photoelectric effect, electron-electron scattering, pair creation and annihilation, indices of refraction, divergence difficulties. (1972–73 and alternate years—fall)

246 **Quantum Field Theory** (3) **Staff**

Covariant presentation of general theory of quantized fields, Boson and Fermion fields, theory of S-matrix, dispersion relations, and renormalization program. (1972–73 and alternate years—spring)

247 **Nuclear Theory** (3) **Staff**

Nuclear interactions, nuclear models, theory of nuclear reactions, pion physics and weak interactions. (1973–74 and alternate years—spring)

248 **Elementary Particles** (3) **Staff**

Scalar, vector, and spinor fields and their particle aspects; weak and strong interactions; symmetry properties and conservation laws. (1973–74 and alternate years—spring)

249 **Statistical Processes** (3) **Staff**

Extension of statistical concepts to irreversible processes. Ergodic behavior, classical and quantum approaches to irreversible effects in large systems, master equations, recurrence paradox and development of thermodynamic concepts. (1972–73 and alternate years—fall)

250 **Selected Topics in Modern Physics** (3) **Staff**

Complements the established curriculum by affording formal instruction in topics of immediate interest to the development of physics and in particular to the members of the graduate research group. May be repeated for credit with permission of graduate adviser. (Fall and spring)

251–52 Laboratory (3–3)
Individual work on special topics. Laboratory fee, $11 a semester. (Academic year)

254 General Theory of Relativity (3)
Physical principles and mathematical methods underlying Einstein's ... equation, geodesic equations of motion, checks of the theory, action ... ciple, conservation laws, perturbation theory, gravitational radia... theory, relativistic cosmology. (1973–74 and alternate years—spri...

291 Seminar (1)
Lectures on special problems in physics. May be repeated once ... credit. (Fall and spring)

299–300 Thesis Research (3–3)
(Fall and spring)

FOURTH GROUP

398 Advanced Reading and Research (arr.)
Limited to students preparing for the Doctor of Philosophy genera... amination. May be repeated for credit. (Fall and spring)

399 Dissertation Research (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for ...
(Fall and spring)

Physiology

Professors C.S. Tidball, R.A. Kenney (*Chairman*), Elizabeth Tidball
Professorial Lecturer Leonard Laster
Associate Professors Marie Cassidy, M.J. Jackson
Assistant Professors R.A. Lavine, D.W. Watkins
Special Lecturer L.L. Langley

Master of Science in the field of Physiology.—Prerequisite: a Bachelor's ... No major is specified, but the undergraduate program must have included ... lowing courses or equivalent: B Sc 11–12; Chem 11–12, 22, 51–52, 53–54; Ma... Phys 1, 2.

Required: the general requirements, pages 93–100. In addition to the thesis, ... hours of required work should include Phyl 201, 221, 298, and at least 3 ... hours of research (Phyl 295).

Doctor of Philosophy in the field of Physiology.—Required: the genera... ments, pages 93–97, 100–102. The program of study includes a major field in Ph... ogy, a subfield (see below) in Physiology, and a minor field outside of Phys... leading to the Cumulative Examination. The 48 semester hours of required ... work leading to the Cumulative Examination should include Bioc 221–22, Phy... 221, 298, 396, 398; and a minimum of 8 semester hours each in two areas ... of Physiology in addition to the minor field.

Research fields and areas of study: Applied Physiology, Cardiovascular Physi... Cellular Physiology, Endocrine Physiology, Gastrointestinal Physiology, Neuro... ology, Renal Physiology, and Respiratory Physiology.

...tor of Philosophy in the field of Biophysics (an interdepartmental field offered ...e departments of Biological Sciences, Physics, and Physiology, see page 232). ...ages 93–97, 100–102, for requirements for the degree.

...partmental prerequisite: Phyl 201 or equivalent is prerequisite to all courses in ...logy numbered above 201.

191 **Selected Topics in Human Structure and Function** (3) Kenney

Lecture (2 hours), laboratory (1 hour). Structural and functional basis of physiology. A required course for graduate students who have not had Anat 201 or equivalent. An undergraduate course; students may receive graduate credit on completion of additional work as prescribed by the instructor. Prerequisite: B Sc 11–12 or equivalent and consent of instructor. Open to Columbian College of Arts and Sciences students with the approval of the student's major adviser. (Fall)

201 **Physiology** (8) Staff

Lecture (8 hours), laboratory (2 hours), conference (1 hour). Cellular, organ system, and applied mammalian physiology. Prerequisite for graduate students: Anat 201 or Phyl 191, or equivalent; Bioc 201 or 221–22 (Bioc 222 may be taken concurrently); or consent of Chairman of Department. Open to Consortium students only with permission of Department Chairman. (Spring)

221 **Seminar** (1) Jackson

Staff and student presentations from literature. Present work discussed, experimental design and scientific deduction evaluated. Topics to be announced. Prerequisite: a reading knowledge of French or German. Content differs each time the course is offered; may be repeated for credit. (Fall and spring)

251 **History of Medicine** (1) E. Tidball

Survey of the great contributors to physiology and medicine in the context of the times in which they lived and worked. (Fall)

252 **Physiological Basis of Sexuality** (2) C. Tidball, E. Tidball

Conference and discussion on topics including communication, psychosexual development, physiological responses, homosexuality, population control and family planning, fertility and sterility, and other topics of interest to the class. (Fall)

253 **Clinical Applications of Physiology** (2) C. Tidball

Emphasis on acid-base and fluid-balance physiology and its relation to clinical problems.

261 **Gastrointestinal Physiology** (2) Staff

Lecture or conference 2 hours a week. Physiological approach to such clinical problems as peptic ulcer, malabsorption, ulcerative colitis, hepatitis, and others. (Fall)

262 **Cardiovascular Physiology** (2) Kenney

Lecture or conference 2 hours a week. An overview of cardiovascular physiology at an advanced level.

264 **Basic Science in Clinical Medicine** (2) Laster

Conferences on basic and clinical research which have brought new

understanding to disease states characterized by inborn errors of metab-
lism. (Fall)

265 Review of Endocrinology (1)

Review of basic endocrinology. (Fall)

266 Advanced Endocrinology (2)

Review at an advanced level of selected topics in endocrinology and m
tabolism. Concurrent registration in Phyl 265 required. (Fall)

267 Renal Physiology (2)

Lecture or conference 2 hours a week. Overview of renal physiol
at an advanced level.

268 Computer Utilization in Physiology and Medicine (2)

Lecture 1 hour a week, practical experience at student's convenie
Orientation to digital and analog mini-computers. Programming in seve
languages. Experience with one or more computers. No previous co
puter experience necessary. (Fall)

269 Neurophysiology and Control Mechanisms (2)

Selected topics in contemporary neurophysiology, including method
data collection and analysis, control mechanisms involved in moveme
and behavior and sensory processing. Open to students in the Sch
of Engineering and Applied Science with permission of instructor.
(Fall)

270 Electron Microscopy in Cellular Physiology (1)

Introduction to the applications of electron miscroscopy in the inves
tion of cellular physiology. (Fall)

273 Investigative Electron Microscopy (3)

Lecture (2 hours), laboratory as arranged. Application of elec
microscopy to biological investigative studies. Limited enrollment.
requisite: Anat 261 or equivalent. Admission by permission of
structor. (Fall)

295 Research (arr.)

By special arrangement with individual Staff members. Approxima
4 clock hours a week in the laboratory for each semester hour of cr
Content differs each time course is offered; may be repeated for cr
(Fall and spring)

298 Comprehensive Physiology (2)

Guided review of selected areas of Physiology appropriate to the
dent's graduate program. This course satisfies the requirements fo
Master's Comprehensive Examination, the Field Examination for gra
students minoring in Physiology, and Part I of the Cumulative Co
Examination in Physiology. Prerequisite or concurrent registration
221. (Fall)

299–300 Thesis Research (3–3)

(Fall and spring)

396 Advanced Reading and Research (2) Staff

Limited to students preparing for the Doctor of Philosophy general examination. Tutorial literature survey of a subfield of Physiology and of pertinent areas of the candidate's minor field. This course satisfies the requirement for Part II of the Cumulative General Examination in Physiology. (Fall and spring)

398 Development of Dissertation Problem (2) Staff

Limited to students preparing for the Doctor of Philosophy general examination. Preparation for written and oral presentation of dissertation problems. This course satisfies the requirement for Part III of the Cumulative General Examination in Physiology. (Fall and spring)

399 Dissertation Research (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

ical Science

essors J.W. Brewer, W.H. Kraus, R.E. Purcell, H.L. LeBlanc (*Chairman*), njamin Nimer, H.C. Hinton, Andrew Gyorgy, B.M. Sapin
torial Lecturer M.H. Leeds
iate Professors J.A. Morgan, Jr., C.F. Elliott, Bernard Reich, Young Kim, L. Linden
ct Associate Professor Donald Robinson
ant Professors S.J. Wayne, J.M. Logsdon, R.E. Darcy, J.M. Starrels
ctors K.L. Storrs, S.W. Burks

lor of Arts with a major in Political Science (Departmental).—The follow- requirements must be fulfilled:
The general requirements as stated on pages 78, 83–88.
Prerequisite courses—P Sc 4 and 6 or 5 and 6; Stat 51 or 53. (12 semester of introductory foreign language courses are recommended for students in- in political theory, comparative government, or international relations.)
Required courses in related areas—18 semester hours of social studies other Political Science, including 6 hours of either Economics or History.
Required courses in the major—30 semester hours of second-group Political courses which must include 6 semester hours from each of Groups A, B, C, listed below. The 6 hours from Group A must include P Sc 105 (which be taken no later than the second semester of the junior year); the 6 hours Group B must include P Sc 103 or 104 or 122 or 145; the 6 hours from must include P Sc 111 or 112; the 6 hours from Group D must include or 181 or 182.
Group A: Political Theory and Methodology—P Sc 105, 107, 117, 118, 119, 160; *Group B:* American Government and Politics—P Sc 103, 104, 108, 125, 126, 145, 146, 149, 150, 151, 167, 199; *Group C:* Comparative and Governments and Politics—P Sc 101, 111, 112, 115, 161, 162, 163, 177, 192, 193, 194; *Group D:* International Politics, Law, and Organization— 172, 178, 181, 182, 189, 197.
in the 90-semester-hour degree program (see pages 84–85) must receive of *A* in at least 18 semester hours of second-group Political Science courses.

Political Science majors may apply for graduation with Special Honors. In order to be recommended by the Department for Special Honors, students must fulfill the general requirements (see page 51) and must complete with distinction a project of independent study, as demonstrated in a written paper, in addition to the normal credit requirements of particular courses. A committee of the Department will review the paper and make the recommendation for Special Honors.

Students who wish to undertake independent study for Special Honors should register with the secretary of the Department *no later than the second week of classes* of the *semester*, and then consult with a member of the Department whose specialized interests lie in the area of the proposed research project. Students registered for P Sc 150 may qualify for graduation with Special Honors by completing with distinction the work connected with their internship.

Master of Arts in the field of Political Science.—Prerequisite: a Bachelor of Arts degree with a major in Political Science at this University (or an equivalent degree) with a *B* average (or better) in the major. The entering student must demonstrate competence in statistics equivalent to the satisfactory completion of an introductory course in Statistics. Students are admitted only in the fall semester.

Required: the general requirements, pages 93–100, including a reading knowledge of a modern foreign language or a specified level of knowledge in statistics. The choice of the foreign language, or of statistics in lieu of a language, must be made with the approval of the Department. With the approval of the Department, students may elect one of the following programs: (1) 24 semester hours of graduate course work plus a thesis (equivalent to 6 semester hours) and the satisfactory completion of a Master's Comprehensive Examination in three fields of political science (selected from the areas of study listed below under the Ph.D. program); or (2) 33 semester hours of graduate course work, including two research seminars (equivalent to 6 semester hours) without a thesis and the satisfactory completion of a Master's Comprehensive Examination in four fields of political science (selected from the areas of study listed below under the Ph.D. program).

Students in either the 30- or 33-semester-hour program must include in their program of study P Sc 201 during the first semester of graduate study unless by waiver examination they can demonstrate equivalent knowledge of the subject-matter of the course.

Doctor of Philosophy in the field of Political Science.—Admission preference is given to applicants who will be full-time students. Students are admitted only in the fall semester. Entering students must have a knowledge of statistics equivalent to the satisfactory completion of an introductory course in Statistics. An otherwise qualified student should satisfy this requirement as early as possible.

Required: the general requirements, pages 93–97, 100–102, including (1) a reading knowledge of two modern foreign languages, or a reading, writing, and speaking proficiency in one modern foreign language, or a reading knowledge of one modern foreign language and a specified level of knowledge in statistics, and (2) the satisfactory completion of examinations in a major and a minor field of study, which constitute the General Examination.

Each student must include in his program of study P Sc 201 and 202 unless by a waiver examination he can demonstrate equivalent knowledge of the subject-matter of the courses.

Major and Minor Fields of Study: Each student has a major and a minor field of study chosen from four principal *subject-matter* divisions of the discipline—Theory and Methodology, International Relations, Comparative and Foreign Politics, and American Politics.

Sub-fields of study: Each subject-matter division includes several sub-fields of study (see below) from which the student constructs his program in consultation with his adviser. A major field of study consists of *three* sub-fields; a minor field consists of *two* sub-fields.

Fields of Study: Theory and Methodology (Analysis of Western Political

ught, Analysis of Marxist and Marxist-Leninist Thought, Scope and Methods Political Science, Quantitative Political Analysis); Comparative and Foreign tics (Comparative Political Analysis, Regional Comparative Politics, Domestic tics of a Specified Major Political System); International Relations (International Politics, International Law, Regional International Relations, Foreign Re- ns of a Specified Major Political System); American Politics (American Politi- Process, National Policy-making Process, American Constitutional Law and tal Process, and State, Local, and Urban Politics).

ctor of Philosophy fields of study in International Relations combine work in conics, History, and Political Science.

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partmental prerequisite: P Sc 4 and 6 or 5 and 6 are prerequisite to all second- p courses in Political Science.

T GROUP

4 Introduction to Political Science (3) **Staff**

Introduction to the study of comparative political systems; emphasis on contemporary concepts and techniques used to examine politics and government. Students who receive credit for P Sc 4 cannot receive credit for P Sc 5. (Fall and spring)

5 Introduction to Political Science (3) **Staff**

Introduction to the study of comparative political systems; emphasis on structures and processes of major foreign governments and the force of basic ideologies. Students who receive credit for P Sc 5 cannot receive credit for P Sc 4. (Fall)

6 Introduction to Political Science (3) **Staff**

Introduction to the study of the structure, powers, and processes of the American political system. (Fall and spring)

OND GROUP

101 Far East in the Modern World (3) **Michael**

General character of Far Eastern societies and their response to the impact of America, Europe, and Russia; American policy in the Far East and the influence of world communism. (Fall)

103 State Politics (3) **Burks**

(This course, together with P Sc 104, replaces former P Sc 103–4 State and Local Governments)

Theory and practice of American federalism, factors influencing state policy choices, state responsiveness to urban problems. (Fall)

104 Urban Politics (3) **Burks**

(This course, together with P Sc 103, replaces former P Sc 103–4 State and Local Governments)

Demographic trends and implications, local metropolitan political systems, issues in urban politics, strategies of political change. (Spring)

105 Scope and Methods of Political Science (3) **Wayne, Kim, Darcy**

Nature of political inquiry, approaches to the study of politics and government, empirical methods of research. Prerequisite: Stat 51 or 53; or equivalent. (Fall and spring)

107 Problems in Modern Political Thought (3) Elliott, Kra

Development of democratic political institutions and analysis of ma ideological changes during the 19th and 20th centuries; attention to th rise of socialism, communism, and facism. (Fall)

108 Science, Technology, and Politics (3) Logad

Examination of the multiple impacts of scientific and technological d velopments on the political system. Discussion of public policies fo the support, use, and control of science and technology. (Spring

111 Comparative Government and Politics (3) Kim, Elliott, Gyorg

Government and politics of the principal constitutional democracies Western Europe. (Fall and spring)

***112 Comparative Government and Politics** (3) Elliott, Gyorgy, Hin

Government and politics of the communist nations; emphasis on th Soviet Union and the countries of Eastern Europe. (Fall and sprin

***115 Government and Politics in Eastern Europe** (3) Gyorg

Study of the contemporary social and ethnic strutures, governmental sy tems, and international position of the Eastern European states wit the Soviet system.

117–18 Political Theory: Nature and Growth of Western Political Thought (3–3) Kraus, Lind

P Sc 117: foundations of Western political thought, classical to medie P Sc 118: Renaissance to recent times. Philosophical roots of mode political order and disorder. (Academic year)

119–20 American Political Thought (3–3) Brewer, Morg

Introduction to political thought in the United States from colonial tim to the present. (Academic year) Morg

121–22 U.S. Constitutional Law and Politics (3–3)

P Sc 121: separation of powers, federal-state relationships, economic re lation. P Sc 122: political and civil rights. Prerequisite: junior sta (Academic year)

125 Legislative Process (3) Darcy, Stan

(Formerly The American Congress)

Study of Congress and the state legislatures, including legislative pro structure, selection of legislators and the roles they play, decision-mak and the relationship between the legislative and executive branches. (Spring) Wi

126 The American Presidency (3)

Development of the institution, selection process, role of the Presid in policy-making. (Fall) Bre

141 Development of Legal Institutions (3)

Introduction to historical jurisprudence: primary attention to the cr of Roman Law of Continental Europe and of Anglo-Saxon Common L (Spring)

* P Sc 112, 115, and 161 are related in their subject matter, and credit for only one of the may be applied toward a degree.

145 **U.S. Political Parties and Politics** (3) LeBlanc, Darcy

Party system and structure, role of ideology, voting behavior, campaigns and elections, devices for organizing the government. (Fall and spring)

146 **Public Opinion and Political Socialization** (3) Darcy

(Formerly Political Pressures and Public Reactions)

Sources of mass political attitudes and behavior, effects of mass attitudes and behavior on public policy. (Spring)

149 **Readings on the U.S. Congress** (3) Robinson

Readings and group discussions of major writings on the structure and processes of the U.S. Congress. Open only to students who are enrolled in P Sc 150 or who have congressional work experience. Selection is by a Departmental committee. (Fall and spring)

150 **Internship in Politics** (3) Robinson

Study of the political process in action through assignment to a political or governmental office. Limited to selected juniors and seniors, with preference given to seniors majoring in Political Science. Seminar open to congressional workers. (Fall and spring)

151 **Public Administration and Public Policy-making** (3) Logsdon

(*Formerly Public Administration*)

Examination of the process by which the federal government selects and implements public policies. Particular attention to the role of bureaucracies in the policy-making process. Criteria for the evaluation of public policy. (Fall)

160 **Modern Communist Ideologies** (3) Elliott

Intensive study of modern communism; emphasis on its antecedents and possible evolution. Careers and ideas of leading figures: Marx, Lenin, Stalin, Khrushchev, and Mao. (Spring)

*161 **Soviet Government and Politics** (3) Linden

Analysis of the Soviet system under Lenin, Stalin, Khrushchev, and Brezhnev; the Soviet Communist Party; government and other topics.

†162 **Government and Politics of China** (3) Staff

Analysis of the government and politics of China, including the Chinese tradition, modern Chinese history, Marxism-Leninism, and Soviet influence.

163 **Soviet Foreign Policy** (3) Elliott

Relations with United States, Third World, China; international communism; instruments of foreign policy; interrelationships of domestic and foreign policies; ideology and foreign policy.

167 **U.S. Foreign Policy** (3) Purcell

Constitutional and political factors that determine the formulation, execution, and substance of U.S. foreign policy. (Fall)

* P Sc 112, 113, and 161 are related in their subject matter, and credit for only one of the three may be applied toward a degree.

† P Sc 162 and 194 are related in their subject matter, and credit for only one may be applied toward a degree.

171 **International Politics** (3) Starrels, Storrs

International actors, international and domestic environments of foreign policy, global and regional patterns, general characteristics of foreign policy. (Fall and spring)

172 **International Organizations** (3) Staff

Development and operations of the United Nations, regional organizations, and functional international organizations. (Fall and spring)

177 **Governments and Politics in Latin America** (3) Storrs

Political processes and institutions in Latin America; emphasis on Argentina, Brazil, Chile, and Mexico. (Fall)

178 **Latin America: Political Patterns and International Relations** (3) Storrs

U.S.-Latin American relations, inter-American diplomacy and organization, foreign policies of selected states, the Cuban revolution. (Spring)

181–82 **Public International Law and Organization** (3–3) Brewer

Survey of the public law of nations. P Sc 181: emphasis on the law of peace. P Sc 182: continuation of the law of peace; attention to neutrality and the so-called law of war. (Academic year)

189 **African International Politics** (3) Nimer

Analysis of interstate relations in Africa and of selected aspects of African relations with the outside world. Recommended but not required: P Sc 190 or equivalent. (Spring)

190 **Politics of Middle and Southern Africa** (3) Nimer

Comparative analysis of the political systems of selected countries of non-Mediterranean Africa. (Fall)

191 **Governments and Politics of the Middle East** (3) Reich

Domestic and international politics of the eastern Arab states, Turkey, Iran, Israel. (Fall)

192 **Governments and Politics of North Africa** (3) Reich

Domestic and international politics of Algeria, Tunisia, Morocco, Libya, Egypt, Sudan; their relations with states of the Middle East. (Spring)

193 **Governments and Politics of South and Southeast Asia** (3) Hinton

Domestic and international politics of the major states in the area. (Spring)

*194 **Governments of China and Japan** (3) Michael

Institutions and processes of government in contemporary China and Japan, with some historical background. Attention to ideological forces. (Spring)

197 **Proseminar: International Affairs** (3) Purcell, Reich, Storrs

Substantive problems of U.S. foreign policy. Readings, term papers, discussion.

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* P Sc 162 and 194 are related in their subject matter, and credit for only one may be applied toward a degree.

199 **American Government and Politics** (3) LeBlanc

Proseminar: reading and research as a basis for analyzing significant problems. Open to seniors in Public Affairs and Political Science curricula. (Spring)

THIRD GROUP

Third-group Political Science courses are designed for graduate students who have appropriate second-group prerequisites.

201 **Scope and Methods of Political Science** (3) Wayne

Introduction to the discipline and the profession, analysis of the nature of political inquiry, discussion of conceptual approaches to the study of politics and government. (Fall)

202 **Approaches to Political Inquiry** (3) Linden

Examination and comparison of some major modes of political thought. Analysis of discursive, systematic, philosophical, and scientific approaches. (Spring)

203 **State Politics** (3) Burks

(This course, together with P Sc 204, replaces former 203–4 State and Local Governments)

Readings and discussions on developments in state politics research, changing roles in the federal structure, state political systems, governmental performance, policy innovation and change. (Fall)

204 **Urban Politics** (3) Burks

(This course, together with P Sc 203, replaces former 203–4 State and Local Governments)

Readings and discussions on patterns and implications of urban growth, local and metropolitan political systems, policy formation and change, conflict management, political constraints on social reform. (Spring)

205 **Government, Science, and Technology** (3) Logsdon

Examination of the demands on national and international political systems resulting from the impact of scientific and technological developments and of the responses of governmental institutions and processes to these demands. (Fall)

206 **Science, Technology, and Public Affairs** (3) Logsdon

In-depth examination of selected domestic policy issues with significant scientific or technological aspects. Teams of students will prepare policy analyses on each issue discussed. (Spring)

207 **Empirical Political Analysis** (3) Darcy

Techniques of data gathering and analysis, the uses of data in political research. (Spring)

208 **Seminar: Science, Technology, and World Order** (3)

Reading and research on selected international policy issues of scientific or technological importance. (Spring)

211–12 **Comparative Government and Politics** (3–3) Kim, Starrels

Problems of comparative political analysis; a comprehensive examination of the literature in comparative politics. (Academic year)

213–14 **Comparative Communist Systems** (3–3) Linden

Comparative study of the communist world; examination of its sources of unity and diversity as well as changing trends in and among communist states and parties. (Academic year)

215–16 **Seminar: the Communist Camp in World Politics** (3–3)

Significant issues of communism, particularly in the Soviet Union and Red China; concept and structure of "world socialist system"; intra-Bloc relations with emphasis on the Sino-Soviet dispute.

217 **Readings in Political Theory** (3) Kraus

Readings and discussions, principally on modern political and constitutional theory since the 17th and 18th centuries; emphasis on basic themes and schools of thought. (Fall)

221 **The United States Constitution and the Judicial Function** (3) Morgan

Lectures and group discussions on constitutional law and politics. (Fall)

224 **Readings in Socialism and Communism** (3) Kraus

Readings and discussion of works illuminating the evolution of pre-Marxian, Marxian, and post-Marxian socialism. (Fall)

227 **Seminar: Governments and Politics of Eastern Europe** (3) Gyorgy

Comparative study of Eastern European states: political, social, economic institutions; problems of regional integration and relations with outside powers. (Spring)

229 **Readings in Soviet Government and Politics** (3) Elliott

Readings in contemporary Soviet domestic government and politics. Prerequisite: 3 semester hours selected from Hist 146, P Sc 112, or equivalent.

*231 **Seminar: Sino-Soviet Relations** (3) Michael

Background, development, and status of conflict within the communist movement; emphasis on the role of Chinese communists. Prerequisite: 3 semester hours selected from Hist 187; P Sc 101, 194; or equivalent. (Spring)

232 **Seminar: International Communications** (3) Staff

East-West perspectives. Theory and history of national patterns of international communications focusing on basic political and psychological aspects of communication between major communist and noncommunist powers. (Spring)

233 **Seminar: Soviet Government and Politics** (3) Elliott

Research seminar in selected problems of Soviet domestic government and politics. Emphasis: since Stalin. Prerequisite: P Sc 229 or permission of instructor. (Spring)

234 **The Soviet Political Process** (3) Linden

Study of patterns of Soviet politics as influenced by ideology, traditions, and accident with focus on the interplay of power and policy in the leadership.

* An interdepartmental course offered by the departments of Political Science and History.

236 **Research Seminar: Urban and Regional Problems** (3) Leeds
(*Formerly P Sc 235–36 City and Regional Planning Processes (3–3)*)
Population and density, race and class, participation and politics, restructuring of government, housing needs, transportation, the culture of the city. (Spring)

*237 **Chinese Law** (3) (Same as Law 547 (2))

*238 **Soviet Law** (3) (Same as Law 546 (2))

245 **The American Political Process** (3) LeBlanc
(*This course, together with P Sc 246, replaces P Sc 245–46 The American Political Process*)
Lecture and discussion on the nature and functions of political parties, interest organizations, and other political groupings in the American political system. (Fall)

246 **American Policy-making Process** (3) Wayne
(*This course, together with P Sc 245, replaces P Sc 245–46 The American Political Process*)
Lecture and discussion on the structure and processes for formulating public policy at the national level. Emphasis on interaction between executive and legislative branches. (Spring)

253 **Seminar: Chinese Government and Politics** (3) Michael
Political institutions and concepts in late imperial times, during the revolution, under national government, and under communism. Emphasis on the communist period. (Fall)

254 **Colloquium: Modern China** (3) Michael
Interuniversity research colloquium of faculty members concerned with the study of modern China. Advanced graduate students admitted with permission of faculty group. (Fall and spring)

255 **Colloquium: Russia and Eastern Europe** (3) Gyorgy
Interuniversity research colloquium of faculty members concerned with the study of Russia and Eastern Europe. Advanced graduate students admitted with permission of faculty group. (Fall and spring)

257 **Seminar: Communism in Developing Countries** (3)
Examination of international communist policy for, and communist parties in, developing countries. Case studies of Asia, Africa, and Latin America.

258 **Seminar: Communist Parties in the Noncommunist World** (3)
Movements and ideological variations of communist parties in Italy, the Scandinavian countries, and other Central and West European nations. Case studies on communist problems of Middle East and North African nations.

265–66 **Chinese Communist Policy Processes** (3–3) Hinton
Introduction to the literature and to graduate research in contemporary Chinese politics. P Sc 265: readings and group discussions. P Sc 266: research seminar. (Academic year)

* Students registering for P Sc 237 or 238 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour. For description of the courses, see the *National Law Center* catalogue.

267 **Seminar: U.S. Foreign Policy** (3) Purcell

Research and selected reading as the basis for an analysis of the foreign policy of the United States, with particular reference to the decision-making process and the execution of policy. (Fall)

268 **Seminar: Comparative Foreign Policies** (3)

Research and selected reading as the basis for an analysis of the foreign policies of major powers, with particular reference to the decision-making process and the execution of policy. (Spring)

269 **Seminar: Soviet Foreign Policy** (3) Elliott

External policies and relations of the USSR; relations with other communist states, Western powers, and other countries. (Spring)

270 **Political and Social Institutions of Eastern Europe** (3) Gyorgy

Major political and social factors which have shaped the inter-war, World War II, and post-war evolution of Eastern Europe; focus on selected countries. (Fall)

271–72 **Problems in International Organizations** (3–3) Reich

P Sc 271: analysis of the political dimension of international organizations; special reference to the United Nations. P Sc 272: examination of the operational and administrative aspects of international organizations; special reference to regional and functional bodies. (Academic year)

273 **Public Opinion and Foreign Policy** (3) Staff

Development, organization, and operation of international information programs by major world powers. U.S. public opinion influencing foreign policy formation and conduct. (Spring)

274 **Principles and Problems of International Political Communication** (3) Staff

Reading and discussion of public opinion/foreign policy relationships and operation of international political communication programs by major world powers as a tool of foreign policy. (Fall)

275 **Theories of International Politics** (3) Nimet

Critical examination of contemporary theories, both empirical and normative. (Fall)

276 **Topics in International Politics** (3) Nimet

Reading, research, and discussion of selected structural and procedural aspects of international political relations. (Spring)

277–78 **Seminar: Latin American Politics** (3–3) Storrs

P Sc 277: readings and discussions on Latin American political processes and institutions. P Sc 278: individual research and class discussion of selected topics of Latin American politics. (Academic year)

281–82 **Seminar: Public International Law** (3–3) Brewer

Research in the public law of nations, with special attention to problems of pacific settlement, sanctions, war, neutrality, and state jurisdiction, and to their political implications. (Academic year)

287 **Seminar: Problems in Latin American Civilization** (3) Gordon

Interdisciplinary seminar partially guided by a specialist in the methodology of his chosen discipline; each student writes a report on some aspect of a selected key theme. Admission by permission of instructor. (Spring)

288 **Seminar: Soviet Military Policy and Strategy** (3) Staff

Soviet developments in military policy and strategy with attention to intra-Bloc military cooperation, political context of Soviet military policy, significant changes in recent Soviet military thought. (Fall or spring)

290 **Topics in African Politics** (3) Nimer

Reading, research, and discussion of selected aspects of African domestic and international politics. (Spring)

291 **Governments and Politics of the Middle East** (3) Reich

Reading and research in selected problems in the governments and politics and international relations of the Middle East. (Fall)

292 **Governments and Politics of North Africa** (3) Reich

Reading and research in selected problems in the governments and politics and international relations of North Africa. (Spring)

293 **Seminar: Governments and Politics of South and Southeast Asia** (3) Purcell

Research and selected reading as basis for analysis of structure, problems, and policies of the governments of selected countries in the area, with particular reference to India. (Spring)

294 **Seminar: Governments and Politics of Japan and Korea** (3)

Readings, research, and discussion on the contemporary political problems and relevant historical background of Japan, North and South Korea. (Fall or spring)

295 **Seminar: Chinese Communist Foreign Policy** (3) Hinton

Objectives; formulation and implementation; Communist China as Asian state, revolutionary influence, would-be great power. Prerequisite: 3 semester hours selected from P Sc 101, 194, or equivalent. (Spring)

296 **The Communist Role in Far Eastern International Politics** (3) Hinton

Evolution of communist Asian strategy, development of Asian communist states and parties, role in international politics and crises, Sino-Soviet rivalry. (Fall)

297 **Independent Studies** (arr.) Staff

Limited to Master's candidates. Permission of instructor, in writing, required. (Fall and spring)

298 **Southeast Asia in World Politics** (3) Staff

Southeast Asia in great-power perspective. Balance-of-power concept and development of Asian subsystem. (Spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

FOURTH GROUP

Fourth-group political science courses are designed for graduate students who have appropriate third-group prerequisites. Offered as the demand requires.

307 Political Parties (3) — LeBlanc
Advanced readings and group discussions.

308 Public Opinion and Political Socialization (3) — Darcy
Advanced readings and group discussions.

309 The American Presidency (3) — Wayne
Advanced readings and group discussions.

310 American Legislatures (3) — Staff
Advanced readings and group discussions.

311 Comparative Government and Politics (3) — Kim, Starrels
Advanced readings and group discussions.

312 Seminar: Comparative Government and Politics (3) — Kim, Starrels
Advanced research.

318 Normative Political Theory (3) — Kraus
Advanced readings and group discussions.

325 Research Seminar: Topics in Marxism-Leninism (3) — Kraus
Advanced research.

345 American Politics (3) — LeBlanc, Darcy
Advanced research.

346 American Government (3) — Wayne, Morgan
Advanced research.

375 International Politics (3) — Nimer, Storrs, Reich
Advanced readings and group discussions.

376 Seminar: International Politics (3) — Nimer, Storrs, Reich
Advanced research.

398 Advanced Reading and Research (arr.) — Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 Dissertation Research (arr.) — Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Portuguese

See "Romance Languages and Literatures."

Psychology

Professors Thelma Hunt (*Emeritus*), E.L. Phillips, J.N. Mosél (*Chairman*), B.I. Levy, W.E. Caldwell, R.D. Walk, R.K. White, Gardner Murphy (*Visiting*), Jacqueline Goodnow, M.L. Meltzer, A.D. Kirsch

Adjunct Professors Yvonne Brackbill, A.J. Caron, Rose Caron

Professorial Lecturers B.M. MacLennan, R.K. Kahn

Associate Professors C.E. Tuthill, Eva Johnson, Virginia Kirkbride, R.H. Tanck (*Research*), D.E. Silber, Charles Rice, Eugene Abravanel, S.A. Karp

Adjunct Associate Professor C.J. Lange

Assistant Professors R.W. Holmstrom, J.A. Bull III, Sally Sibley (*Research*), L.A. Rothblat

Assistant Professorial Lecturer S.L. Cohen

CLINICAL TRAINING STAFF

Associate Clinical Professors A.M. Rochlin, Donald Jewell, I.M. Zimmerman, Bruce Becker, J.W. Cummings, Mimi Spielberg, Barbara Hammer, Meira Zedek, Elliot Blum

Assistant Clinical Professors Alice Adams, Andrea Doman, J.M. Smothers

Bachelor of Arts with a major in Psychology (*Departmental*).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirements for "meaningful initiation" into the Humanities and the Natural and Mathematical Sciences.

2. Prerequisite courses—6 semester hours selected from Psyc 1, 5, and 6.

3. Required courses in related areas:
(a) 3 semester hours selected from Stat 51, 53, 104, or any first-group course in Mathematics except Math 6. (Students expecting to do graduate study in Psychology should elect Stat 53 or 104.)
(b) 6 semester hours selected from *one* of the following departments: Anthropology, Economics, History, Political Science, or Sociology.
(c) 6 semester hours selected from American Civilization, Anthropology, Economics, Geography and Regional Science, History, Philosophy (Phil 71, 113, 151 recommended), Political Science, Religion, or Sociology.
(d) One course (3 or 4 semester hours) in Biological Sciences (B Sc 3 recommended). This course is required *in addition* to the general requirement for "meaningful initiation" into the Natural and Mathematical Sciences (see page 78).

4. Required courses in the major—24 semester hours in second-group Psychology courses, including Psyc 196 and one course from each of the following groups—Group A: Psyc 118, 121, 161; Group B—Psyc 115, 151, 156; Group C—Psyc 112, 131, 144.

Although there is no foreign language requirement, students contemplating graduate study are reminded that most graduate schools require knowledge of one and sometimes two foreign languages.

Master of Arts in the field of Psychology.—Prerequisite: the degree of Bachelor of Arts with a major in Psychology at this University, or an equivalent degree. Admission to the program is limited; preference will be given those who plan to continue toward a Doctor of Philosophy degree.

Required: the general requirements, pages 93–100. Of the 24 required semester hours (exclusive of the thesis), a minimum of 18 must be in third-group Psychology courses including Psyc 202 and either 203 or 204; 6 may be in related fields approved by the Department. For detailed requirements consult the Chairman of the Department.

Doctor of Philosophy in the field of Psychology.—Prerequisite: the degree of Bachelor of Arts with a major in Psychology. Students admitted from other disciplines will be expected to complete prerequisite undergraduate courses to prepare for graduate study in Psychology. Qualifying scores on the Miller Analogies Test and the Aptitude Test of the Graduate Record Examination are required for admission.

Required: the general requirements, pages 93–97, 100–102, including (1) the satisfactory completion of the tool requirement (see pages 100–101); (2) Psyc 202, 203–4, Stat 105; and (3) the satisfactory completion of two General Examinations (one in general psychology, one in an area of specialization).

Areas of study: Clinical, Developmental, Experimental, Industrial and Organizational, Social, Personality and Experimental Psychopathology.

Students electing Psychology courses in the freshman year should begin with Psyc 1; with permission of instructor students may elect Psyc 5–6 in the freshman year.

Departmental prerequisite: Psyc 1 or 5 or 6 is prequisite to all other courses in Psychology. Six semester hours in Psychology courses are prerequisite to all second-group courses in Psychology. The departmental prerequisite may be waived with the permission of the instructor

FIRST GROUP

1 General Psychology (3)

Fundamental principles underlying human behavior. (Fall and spring

5–6 Principles and Methods of Psychology (3–3)

Lecture (2 hours), laboratory (2 hours). An experimental approach to understanding behavior; individual and class experiments performed. Psyc 5: sensation, perception, and emotions and their relation to adaptive behavior. Psyc 6: topics of motivation, learning, memory, and problem-solving. Laboratory fee, $6 a semester. (Academic year)

8 Psychology of Motivation and Personality (3) Tuthill, Silber, Rice, Holmstrom

Introduction to the psychology of personality. Principles of motivation, personality development, social and cultural factors, and assessment and description of personality emphasized. (Fall and spring)

22 Introduction to Educational Psychology (3) Kirkbride, Tanck

The contributions of psychology to education; emphasis on learning (Fall and spring)

29 Psychology of Childhood (3)

Developmental approach to study of the child. Emphasis on the socialization process, learning, and the child's view of the world. (Fall and spring)

SECOND GROUP

101 Abnormal Psychology (3) Meltzer, Silber, Holmstrom

Causes, diagnosis, treatment, and prevention of various types of maladjustments and mental disorders. Prerequisite: 6 semester hours in psychology, or 3 in psychology and 6 in a biological science. (Fall and spring)

110 **Cognitive and Perceptual Development** (3) Abravanel

Concepts and research in the area of developmental psychology; emphasis on the growth and development of perception, cognition, and language. (Spring)

112 **Psychology of Adolescence** (3) Johnson

Psychological characteristics and problems peculiar to adolescence, with emphasis on applications of psychology to solution of such problems. (Fall)

115 **Psychology of Language and Communication** (3) Mosél

Introduction to psycholinguistics and verbal behavior. Information theory, generative grammar theory, cultural and linguistic structures in the perception and learning of language. (Fall)

118 **Neuropsychology** (3) Rothblat

(*Formerly Physiological Psychology*)

Analysis of neural processes underlying behavior. Basic structure and functions of the nervous system, with emphasis on sensory processes, learning and memory, motivation, and emotion. (Fall and spring)

121 **Psychology of Learning** (3) Bull

Theories and issues related to basic learning processes as determinants of behavior. Emphasis on current research using both human and animal subjects. (Fall)

129 **Theories of Personality** (3) Kirkbride, Karp

Survey of personality theories; emphasis on their application to problems of individuals. (Fall and spring)

131 **Psychological Tests** (3) Hunt, Karp

Survey of psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee, $7. (Fall and spring)

144 **Personnel and Industrial Psychology** (3) Mosél

Psychological concepts and methods applied to problems of personnel management, human engineering, employee motivation, and productivity. (Spring)

145 **Psychology of Management** (3) Cohen

Primarily for students in the schools of Engineering and Applied Science and Government and Business Administration. Psychological aspects of managing work organizations. (Fall)

151 **Social Psychology** (3) Tuthill, White

Social foundations of attitudes and behavior: cognition, motivation, role-behavior, communication, small-group processes, racial attitudes, nationalism, and war. (Fall and spring)

156 **Psychology of Attitudes and Public Opinion** (3) Tuthill

Psychology of opinion formation, measurement of opinion, social determinants of attitudes, psychological processes in propaganda, bases of receptivity to propaganda, psychological warfare. (Spring)

161 **Comparative Psychology** (3) Caldwell

Lectures and demonstrations on animal psychology. Psychological processes in infrahuman organisms, evolution of behavior, the place of animal experimentation and research in psychology. (Spring)

191 **Independent Research in Psychology** (3) Staff

Opportunity for work on individual library or experimental projects. Open to qualified students by permission; arrangements must be made with the sponsoring faculty member prior to registration. May be repeated once for credit. (Fall and spring)

192 **Field Experience in Psychology** (3) Abravanel, Levy

Selected senior psychology majors will spend a minimum of 6 hours a week in a local hospital, school, or community setting. Students registering for this course must have the approval of the instructor by May 1 for the fall semester and by December 15 for the spring semester. (Fall and spring)

196 **History and Systems of Psychology** (3) Caldwell and Staff

Senior capstone course which includes a survey and integration of the major viewpoints and concepts of psychology. Required of Psychology majors. (Fall and spring)

198 **Current Research Issues in Psychology** (3) Staff

Conducted as a seminar. Recent experiments in psychology, including those performed by members of the class; emphasis on student participation. May be repeated for credit. (Spring)

THIRD GROUP

Third-group courses are limited to graduate students in Psychology, except by special permission of instructor and Chairman of the Department.

202 **Psychological Research Methods and Procedures** (3) Abravanel, Bull

Required in all graduate Psychology programs. Prerequisite: graduate standing, a laboratory course in psychology, and an elementary course in statistics. (Spring)

203–4 **Experimental Foundations of Psychology** (3–3) Bull, Rothblat

Required of doctoral students in Psychology during first year of study. Psyc 203: basic issues in learning and motivation. Psyc 204: physiological processes; sensation and perception. (Academic year)

205 **Research Methods in Intervention Programs** (3) Kurtz

Special problems of conducting research in a clinical setting; emphasis on content and method of studies designed to assess effects of therapeutic intervention. Prerequisite: Psyc 202. (Fall) Katz

206 **Methods of Clinical and Personality Research** (3)

Review of techniques especially relevant to research in clinical, personality, and social psychology. Scaling methods, multivariate techniques, introduction to the use of computers in data analysis. Prerequisite: Psyc 202; Stat 105 or equivalent. (Spring)

207–8 **Psychological Assessment** (3–3) Holmstrom, Levy, Meltzer, Silber

Open only to graduate students in the Department of Psychology. Theoretical and clinical aspects of assessment; includes interviewing, psychometric tests, and projective techniques. Two-hour laboratory—diagnostic work at clinical facilities. Material fee, $7 a semester. (Academic year)

209 **Seminar: Psychology of Motivation** (3) Caldwell

Various theoretical approaches to the psychology of motivation; systematic concepts and experimental findings deriving from each approach. (Spring)

211 **Assessment of Cognitive Functioning** (3) Karp

Concepts of intelligence and achievement and their assessment through a variety of group and individual procedures. Emphasis on evaluation of children. Material fee, $7. Admission by permission of instructor. (Fall)

212 **Personality Assessment by Projective Techniques** (3) Levy

Methods of personality assessment, including psychometric and projective tests. Material fee, $7. Admission by permission of instructor. (Spring)

213–14 **Seminar: Developmental Psychology** (3–3) Abravanel, Walk

Psyc 213: research and theory in developmental psychology, emphasis on perceptual and cognitive development; consideration of the development of social awareness and of genetic-biological growth processes. Psyc 214: current research and theory in perceptual and cognitive development, intensive study of selected research problems. (Academic year)

215 **Personality Assessment by Multiple Procedures** (3) Meltzer

Consideration and use of a wide range of procedures in assessment of personality and psychopathology of children. Prerequisite: Psyc 207–8 or 211 and 212. Graduate students in fields other than Psychology admitted by permission of instructor. Material fee, $7.

218 **Seminar: Systems of Psychotherapy** (3) Silber

Introduction to theory and technique of psychotherapeutic approaches: psychoanalytic, ego-centered, nondirective, transactional, and others. Original sources surveyed. (Spring)

220 **Seminar: Abnormal Psychology** (3) Meltzer

Study of selected problems. (Fall)

221–22 **Seminar: Group Psychotherapy** (3–3) MacLennan

Psyc 221: didactic material and laboratory experience with emphasis on group dynamics and processes; survey of group therapy approaches. Psyc 222: supervised experience with therapeutic groups. Prerequisite to Psyc 222: Psyc 221 and permission of instructor. (Academic year)

223 **Seminar: Learning** (3) Bull

Selected topics of current research interest in the psychology of learning. (Spring)

226 **Seminar: Clinical Psychology of Childhood and Adolescence** (3) Johnson

Survey of behavior and personality disorders. (Spring)

227–28 **Seminar: Principles of Psychotherapy** (3–3) Kahn

Patient's needs and demands on the therapist. Case participation heavily relied upon. Open to qualified students in Psychology and related fields with permission of instructor. Prerequisite: Psyc 218. May be repeated once for credit. (Academic year)

229 **Seminar: Principles of Behavior Change** (3) Phillips

Stimulus-organism-response variables and their interactions, with emphasis on learning theory as applied to clinical problems. (Fall)

230 **Seminar: Operant Applications to Clinical Problems** (3) Sibley

Examination of the broad role of reinforcement contingencies, behavior shaping, and other experimentally derived concepts as they apply to the management and control of a wide variety of human clinical problems. Prerequisite: Psyc 229. (Spring)

231 **Development of Psychometric Instruments** (3) Kirsch

Quantitative techniques and principles used in construction, standardization, and evaluation of personality and ability measures for research and practice; quantification of human judgment for measurement purposes. Prerequisite: course in tests and measurements and an elementary course in statistics. (Fall)

234 **Seminar: Theory of Psychological Measurement** (3) Kirsch

Development of classical axiomatic-deductive theory underlying major assumptions in the construction and evaluation of psychological tests. (Spring)

235–36 **Seminar: Community Mental Health** (3–3) Meltzer, Levy

Survey of issues and techniques in community mental health; emphasis on educational systems and community mental health issues in the schools. Involves project in school setting. Prerequisite to Psyc 236: Psyc 235. (Academic year)

245 **Seminar: Organizational Behavior** (3) Mosel

Analysis of organizational behavior; emphasis on motivation and productivity. Recent research on employee attitudes, primary group, supervisory leadership, formal and informal organization, job design. (Spring)

246 **Seminar: Personnel Measurement Techniques** (3) Mosel

Detailed consideration of techniques of personnel selection and performance evaluation. Employment tests, personal data, assessment interviews and performance ratings.

251 **Seminar: Advanced Social Psychology** (3) Tuthill, White

Current research and theory: motivation and cognition, dissonance, social interaction theory, authoritarianism, class differences, group dynamics, group conflict. (Fall)

252 **Research Methods in Social Psychology** (3) Tuthill

Opinion and attitude survey techniques: interviewing, content analysis, report-writing, etc. (Spring)

254 **Seminar: Experimental Social Psychology** (3) Tuthill

Experimental study of small groups, group climates, interaction process

analysis. Lewin's field-theoretical approach to individual and group processes. (1973–74 and alternate years—spring)

256 **Seminar: Psychological Causes of War** (3) White

An attempt to integrate evidence from animal behavior, child behavior, anthropology, psychiatry, and recent history, including World Wars I and II and the present East-West conflict. (Spring)

259 **Seminar: Social Psychology of Communism** (3) White

Public and governmental opinion in communist countries, authoritarian thinking, communist propaganda, problems of Western communication with communist countries. (Fall)

261 **Seminar: International Communication** (3) Mosél

Primarily for students in the schools of Government and Business Administration and Public and International Affairs. Communicating information and effecting attitude change across cultures by mass media. Psychocultural factors and the functions of mass communication in the development of transitional societies. (1973–74 and alternate years—spring)

272 **Seminar: Theories of Personality** (3) Caldwell

Emphasis on theoretical problems and methodology in the field of personality study. (Fall)

283–84 **Practicum in Clinical Psychology** (3–3) Silber

Supervised practical instruction in agencies doing clinical psychological work. Prerequisite: Psyc 212. Admission by permission of instructor. (Academic year)

289 **Seminar: Current Topics in Experimental Psychology** (3) Staff

Review and discussion of contemporary research and theory in a specialized field of psychological study, by leaders in the field. Independent topics each semester; may be repeated for credit. (Fall and spring)

290 **Seminar: Special Problems in Personality Research** (3) Murphy

Selected theoretically important and challenging contemporary research problems. May be repeated once for credit. (Fall and spring)

292 **Seminar: Perception** (3) Walk

Study of current research and theory in the experimental psychology of perception. (1972–73 and alternate years—fall)

293 **Seminar: Psychology of Thinking** (3) Rice

Review of basic theoretical positions concerning the processes of cognition: memory, concept formation, and reasoning. (1973–74 and alternate years—spring)

295 **Independent Research in Psychology** (arr.) Staff

Individual library or experimental research under supervision of staff member. Arrangements must be made with sponsoring faculty member prior to registration. May be repeated once for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

FOURTH GROUP

398 Advanced Reading and Research (arr.)

Limited to students preparing for the Doctor of Philosophy general e
amination. May be repeated for credit. (Fall and spring)

399 Dissertation Research (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for cred
(Fall and spring)

Public Administration

Professors D.S. Brown, Waldo Sommers, K.E. Stromsem, D.R. Cloutier (*Chairman*)
Professorial Lecturers W.G. Torpey, C.E. Goode, Ben Posner, C.L. Berg, R.J. Temple
Associate Professor S.R. Chitwood
Associate Professorial Lecturers Ross Pollock, L.B. Pouliot, W.E. McConville, M.R. Burt
Assistant Professor M.M. Harmon

Programs of study in Public Administration leading to the degrees of *Master of Public Administration*, *Master of Arts in Government*, and *Doctor of Public Administration* are offered by the School of Government and Business Administration (see pages 131–60).

THIRD GROUP

213 Administration in Government (3)

Critical analysis of federal administrative organizations as an integral part of the political system. Roles of Congress, the President, the courts, interest groups, political parties, and the public in the administrative process; special attention to centripetal and centrifugal forces. (Fall and spring)

214 Policy Analysis in Public Administration (3)

Introduction to systematic analysis of public policy alternatives. Development of a conceptual framework for differentiating types of public policies, e.g., distributive, regulatory, redistributive; examination of the contribution of economic, quantitative, and research techniques to the development, administration, and evaluation of these policies.

215 Comparative Administrative Systems (3)

Examination and analysis of the administrative systems of selected foreign governments; attention to practices applicable to administration in the United States.

216 Administration of International and Supranational Activities (3)

Analysis of the evolution and application of the administrative process in selected international and supranational activities. Problems of organization and management in multinationally supported and staffed activities

217 **Seminar: Developmental Administration I** (3) Brown

National cultures and their relationships to administrative systems. Colonialism and its vestiges. The problems and deficiencies of administration in underdeveloped countries. (Fall)

218 **Seminar: Developmental Administration II** (3) Brown

Problem of the transfer of administrative capability from one country to another. Political and administrative development. Unilateral and multilateral approaches. The role of the innovator. Strategies of administrative development. (Spring)

221 **Management in the Executive Branch** (3) Harmon

Analysis of application of management theory and practice in the executive branch of the federal government; emphasis on staff responsibilities and relationships and internal organization and control. (Fall and spring)

223 **Behavioral Factors in Large Organizations** (3) Brown

Analysis of the nature and characteristics of bureaucracy; dysfunctionalism; approaches to policy guidance and leadership, particularly in large public organizations; influence and control systems. (Fall and spring)

231 **Public Personnel Administration** (3) Sommers

Survey of basic principles and functions of personnel administration in the public service. Roles of personnel management, recruitment, placement, wage and salary administration, training, retirement, and other personnel functions. (Fall)

232 **Problems in Public Personnel Management** (3) Sommers

Analysis and evaluation of major personnel management problems in government; employee-management relations; interagency and intergovernmental relationships. Impact of automation. Evaluation of personnel systems. (Spring)

233 **Seminar: Manpower Development and Utilization** (3) Harmon

Analysis of manpower resources. Research projects and case studies in ways and means of increasing employee potential; use of training programs, executive development, incentive systems. (Fall)

235 **Technological Change and Manpower** (3) Staff

Research, discussion, and readings dealing with manpower problems arising from automation and other technological changes. Evaluation of these developments in government and business; their implications for productivity, employment, training and education, and personnel and industrial relations. Analysis of economic, political, and social factors influencing public and private industry manpower policies. (Spring)

*243 **Local Government Law** (3) (Same as Law 349(2))

246 **Urban Dynamics and Citizen Participation in Administration** (3)

Exploration of the nature, costs, and benefits of citizen participation in administration of metropolitan area programs. Focus on tools of citizen participation, their impact on federal policy and reorganization of urban

*Those registering for P Ad 243 make special arrangements with the instructor for supplementary work equivalent to one additional semester hour. For description of the course, see the *Law Center catalogue.*

government, and the effect of decentralization on citizen participa
(Fall)

248 **Financing Metropolitan Services** (3) Clow
Analysis of the structure and administration of public finance of lo
governments. (Spring)

249 **Administration in Metropolitan Area Governments I** (3) Burt, Harm
Public administration in metropolitan areas. An ecological approach
understanding the interrelationship between the management of urb
programs and economic, social, and political factors that affect the urb
environment. (Fall)

250 **Administration in Metropolitan Area Governments II** (3) Burt, Chitwo
Application of policy analysis in metropolitan administration, includi
the consideration of specific federal, state, and local programs in met
politan areas. (Spring)

*251 **Governmental Budgeting** (3) Stromsem, Pow
Survey of the basic concepts, principles, and practices in governmen
budgeting; interrelationship of planning, programming, and budgetin
their role in the management process. (Fall and spring)

*252 **Problems in Planning, Programming, and Budgeting** (3) Chitwo
Intensive analysis of developments in federal planning, programming,
budgeting; application of new tools in the decision-making process; eva
ation of the systems. (Fall and spring)

254 **Seminar: Financial Management in the Federal Service** (3) Stromse
Functions and interrelationships of central federal financial manage
agencies, their policy, economic and managerial roles, controllership fu
tions, and standards and practices in financial management. (Spri

260 **Seminar: Policy Formulation and Administration** (3) Chitwo
Analysis in depth of factors and processes involved in policy develop
with particular attention to selected areas of national policy; develop
of agency goals and objectives. (Fall and spring)

261 **The Public and the Administrator** (3)
Nature of the public interest, ways of determining public opinion, rel
opinion and the decision-making process, theories and methods of work
with the public, interest groups, public relations and information p
grams.

262 **Seminar: Science, Technology, and Public Policy** (3)
The impact of science and technology upon public administration in th
of both administrative practice and national policies. (Spring)

†263 **Seminar: Regulation of Transportation I** (3) (Same as Law 407 (2))

†264 **Seminar: Regulation of Transportation II** (3) (Same as Law 408

* Special sections of this course offered in the Navy Graduate Financial Management Pro
† Students registering for P Ad 263 or 264 make special arrangements with the instructor for ad
mentary assignments equivalent to one additional semester hour. For description of the cours
the *National Law Center* catalogue.

271 **Readings and Research in Public Administration** (3) Staff
Advanced directed readings and research in specific areas. (Fall and spring)

273 **Colloquium: Public Administration and American Political and Social Institutions** (3) Cloutier
Supervised study in depth of contemporary literature in selected fields, and of research methodology in public administration. Primarily for doctoral candidates. (Fall)

274 **Trends in Public Administration Theory** (3) Harmon
Survey of contemporary normative and epistemological issues in public administration theory and practice. Analysis of the past and present influence of logical positivism, behavioralism, humanism, existentialism, phenomenology, and public interest theory. Required for doctoral candidates; open to advanced Master's degree candidates with permission of instructor. (Spring)

299 **Thesis Seminar** (3) Sommers
Examination of thesis standards, research philosophy and methodology. (Fall and spring)

300 **Thesis Research** (3) Staff
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Public Administration general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Public Administration candidates. May be repeated for credit. (Fall and spring)

Public and International Affairs*

Professors A.E. Burns, J.W. Brewer, H.M. Merriman, R.H. Davison, W.H. Kraus, R.B. Thompson, J.W. Kendrick, C.T. Stewart, Jr., H.L. LeBlanc, J.E. Galbreath, J.N. Mosél, W.C. Hopkins, F.H. Michael, Joseph Aschheim, R.K. White, Benjamin Nimer, J.W. Robb, Helen Yakobson, R.P. Sharkey, Andrew Gyorgy, George Stambuk, H.C. Hinton, H.M. Sachar, Vladimir Petrov, B.M. Sapin, Kurt Wilk (*Visiting*), Chung-wen Shih, Ching-Yao Hsieh, Gaston Sigur

Adjunct Professor C.B. Sargent

Professorial Lecturers Bela Maday, Joseph Baclawski, John Hardt, Tao-tai Hsia, Matthew Gallagher, L.C. Tihany, Roman Kolkowicz, Bernard Ramundo, Lothar Metzl, T.W. Wolfe

*Programs in Chinese Studies; International Affairs; Public Affairs; Russian Studies; and Science, Technology, and Public Policy are administered by the School of Public and International Affairs. Walter Sharp, Dean.

Associate Professors P.P. Hill, W.R. Johnson, Marvin Gordon, J.K. McDonald
J.A. Morgan, Jr., C.F. Elliott, R.Y.C. Yin, C.A. Moser, Bernard Reich
Richard Thornton, R.M. Dunn, Jr., C.A. Linden, Peter Poole
Adjunct Associate Professor Donald Robinson
Associate Professorial Lecturer Philip True
Assistant Professors G.C.Y. Wang, D.L. Lee, S.J. Wayne, J.M. Logsdon, R.
Darcy, J.M. Starrels, P.L. Sargent (*Visiting*)
Instructors K.L. Storrs, S.W. Burks

Bachelor of Arts in the field of Chinese Studies.—Prerequisite: the Chinese Studi
curriculum, page 82–83, including Asia 5–6.

The general requirements are stated on pages 164–66. The 60 semester hours m
include (1) Asia 11, and 165 or 167; (2) Econ 169; (3) 3 semester hours selecte
from Geog 125, 126, 127, 132, 145, 146, or 161; (4) 6 hours selected from Hi
138, 187, 188, 195, 196 (either Hist 187 or 196, but not both, may be selected
(5) 3 hours selected from P Sc 101, 193, 194; (6) 24 semester hours of relat
course work of which 6 hours must be a research and writing seminar in Economi
History, or Political Science to be selected with the approval of the adviser.

Bachelor of Arts in the field of International Affairs.—Prerequisite: the Inte
national Affairs curriculum, pages 82–83.

The general requirements are stated on pages 164–66, 166–67. The 60 requir
semester hours must include (1) Econ 181–82; (2) 6 semester hours of a third ye
of foreign language (may be a literature course taught in the language); (3)
semester hours selected from Geog 125, 126, 127, 132, 145, 146, or 161; (4) H
150 or 157, and 182; (5) P Sc 171, and 181 or 182; (6) 15 semester hours fro
one of the Group Options listed below:

Group I. International Politics—courses selected from Geog 125, 126, 127, 1
Hist 138, 139–40, 149, 183, 184; P Sc 107, 111, 112, 117–18, 160, 167, 172, 1

Group II. International Economics—courses selected from B Ad 178; Econ 1
102, 104, 121, 122, 134, 147; Geog 125, 126, 127, 132, 134; Stat 111, 112, E

Group III. International Communications—courses selected from Anth 150, 1
157, 161, 162; Geog 125; Jour 145, 146; P Sc 146, 167; Psyc 115, 151, 156; Soc 1

Group IV. Regional Study with a concentration in one of the following area
(1) Africa—courses selected from Anth 178, 179, P Sc 189, 190, 192; (2) Europe
courses selected from Econ 147, Hist 131–32, 141–42, 147, 149, 151–52, 158,
P Sc 111, 112, 117–18; (3) Far East—courses selected from Anth 173, 174,
Asia 165, 167, Econ 169, Hist 138, 187, 188, 195–96, P Sc 101, 193, 194; (4) La
America—courses selected from Anth 170, 172, 185, Econ 185–86, Geog 161,
162, 163–64, 165, 166, P Sc 177, 178, interdisciplinary seminar 287 offered by
departments participating in the Latin American Studies program; (5) Middle Eas
courses selected from Anth 177, Hist 149, 158, 193, 194, P Sc 191, 192, Reli
or (6) Soviet Union and East Europe—courses selected from Econ 133, 134,
138, 143, 145–46, 188, P Sc 112, 115, 160, 161, 163, Slav 161–62, 165, 166, 19

Bachelor of Arts in the field of Public Affairs.—Prerequisite: the Public Affa
curriculum, page 83.

The general requirements are stated on pages 164–66, 167. The 60 required se
ter hours must include (1) Econ 161, 162; (2) Hist 175–76; (3) P Sc 121, 12
151, 145; (4) 12 semester hours from one of the Group Options listed below;

Group I. Economics—courses selected from Econ 102, 104, 121, 122, 123,
142, 165, 181–82.

Group II. Politics—courses selected from P Sc 103 or 104, 108, 111, 119–20,
126 (if not elected previously), 146, 167, 199.

Group III. Urban Affairs—courses selected from B Ad 174, Econ 157, Educ
Geog 141, P Sc 103, 104, Psyc 151, Soc 126.

Master of Arts in the field of International Affairs.—Prerequisite: a Bachel

ge from an accredited college or university with background courses correspond-
to an undergraduate major in International Affairs at this University.
equired: the general requirements, pages 168–71. The program of study consists
ther 24 semester hours of course work plus a thesis (equivalent to 6 additional
ester hours) or 36 semester hours of course work without a thesis. All students
demonstrate proof of a reading knowledge (certified by the appropriate de-
rtment) of a modern foreign language (see "Tool Requirements," page 169).
The following specific requirements must be met by students electing to write
esis:
(a) A minimum of 24 semester hours of graduate courses, selected in consulta-
with an adviser, based on the student's selection of three fields of study within
road area of International Affairs (see below). These three fields must include
ast one general field and represent at least two disciplines. Students must elect
e work in at least two departments, not to exceed 15 hours in either.
(b) The candidate must pass the Master's Comprehensive Examination—a set
itten examinations over the three fields selected by the student.
(c) The candidate must register for P Sc 299–300 *Thesis Research (3–3)* and
mplete an approved thesis.
The following specific requirements must be met by students electing the 36-
ester-hour program without a thesis:
(a) A minimum of 36 semester hours of graduate course work (no more than
hours may be taken in one department) designed to prepare the student for the
ster's Comprehensive Examination in four comprehensive fields (see below). The
should represent at least two disciplines, and one field should be general.
(b) At least two of the courses taken should be research seminars requiring
eparation of substantial research papers.
elds for the Master's Comprehensive Examinations
eneral—International Politics, Comparative Government, Modern Political
ory, International Economics
mplementary or Special—International Law; International Organization and Ad-
inistration; International Economic Development; International Communications; In-
rnational and Comparative Aspects of Communism; U. S. Diplomatic History; U. S.
reign Policy; Science, Technology, and Public Policy
egional Studies—Modern History, or Government and Politics, or Economic
ory and Problems of one of the following: Western Europe, Eastern Europe,
e Union, Latin America, the Middle East, Africa, South and Southeast Asia,
ina.

ster of Arts in the field of Latin American Studies.—Prerequisite: a Bachelor's
ee with a major in Latin American Studies, or equivalent. Majors in other fields
e considered for admission to Master's candidacy provided their undergraduate
ogram includes sufficient course work in three of the following six areas: Anthro-
logy, Economics, Geography and Regional Science, Hispanic Literatures, History,
d Political Science.
The Master's degree program in Latin American Studies is designed to provide
e student with an appropriate area background in three or four of the following
as: Anthropology, Economics, Geography and Regional Science, Hispanic Litera-
res, History, and Political Science.
quired: in addition to the general requirements, pages 168–70, the following
quirements must be met: (1) 12 semester hours of graduate work, including the
sciplinary seminar (287), in a major field selected from the fields listed above;
) 6 semester hours each in two minor fields selected from the fields listed above;
) thesis (299–300), 6 semester hours, in the major field (if a nonthesis program
approved, the student must elect 12 semester hours of course work in place of the
urs of thesis—6 hours in an additional minor field and 6 in any of his fields,
jor or minor); (4) demonstration of proficiency in Spanish or Portuguese, or in
ies if the student's native language is Spanish or Portuguese; (5) the passing

of a Master's Comprehensive Examination in the major field and in the two or th
minor fields.

Master of Arts in the field of Public Affairs.—Prerequisite: a Bachelor's deg
from an accredited college or university with an undergraduate major in pu
affairs, economics, history, or political science, depending upon the field of specia
zation in the Master's program.

Required: the general requirements, pages 168–70, 171. The program of study c
sists of either (1) 24 semester hours of course work plus a thesis (equivalent t
additional semester hours) or (2) 36 semester hours of course work without a the
The student may select his courses in consultation with an adviser to emphas
either political science, economics, or American history, provided (1) he elects
more than 15 hours of courses in one department under the 24-hour plus a th
program, or (2) he elects no more than 21 hours in one department under
36-hour program. Course work may include: Economics (public finance, natio
income, economic development, regional and urban economics, monetary theo
labor economics, welfare economics); History (U.S. social history, political histo
economic history, recent history); Political Science (political parties, public opin
and political socialization, constitutional law, the American presidency, legislat
process, state and local government, comparative political analysis).

Master of Arts in the field of Russian Studies.—Prerequisite: a Bachelor's deg
from an accredited college or university with an undergraduate major in a pertin
field. The undergraduate program should have included the following courses,
equivalent: Hist 145–46; P Sc 112 or 161; Slav 1–2 and 3–4, or 5–6.

Required: the general requirements, pages 168–70, 172. The program of study c
sists of either (1) 24 semester hours of course work plus a thesis (equivalent to 6
ditional semester hours) or (2) 36 semester hours of course work without a the
The required courses are Econ 133; Hist 237, 245; P Sc 224, 229, 269; Slav 161-
or 165 and 166; and if a thesis is elected, *Thesis Research* (299–300). With the
ception of thesis, students may, with the approval of the adviser, substitute alter
courses. The thesis should be interdisciplinary in approach.

Master of Arts in the field of Science, Technology, and Public Policy.—Prereq
site: a Bachelor's degree from an accredited college or university with an undergr
uate major in a social, life, or physical science, or in engineering.

Required: the general requirements, pages 168–70, 172. The program of st
consists of either (1) 24 semester hours of course work plus a thesis (equivalent
6 additional semester hours) or (2) 36 semester hours of course work without
thesis. The required courses are P Sc 205, P Sc 206 or 208, P Sc 299–300 (
thesis is elected), and a course in methods for the analysis of public policy
remainder of the required courses, chosen in consultation with the student's advi
should be distributed over two fields if a thesis is elected, or over three fields if
thesis is not elected.

Master of Science in International Affairs.—Offered in off-campus programs at
National War College, Fort McNair, Washington, D.C., and the Naval War Colle
Newport, R.I.

INTERNATIONAL AFFAIRS

The following courses are offered only in the War Colleges' curricula:

THIRD GROUP

250 **International Relations of Latin America** (3)

259 **Seminar: International Relations of Western Europe** (3)

260 **Fundamentals of National Power** (3)

261 International and U.S. Foreign Policy (3)

262 National Security Policy of the United States (3)

263 Intercultural Relations (3)

265 Seminar: Diplomacy, Strategy, and Arms Control (3)

287 Power Politics in the Pacific (3)

288 Seminar: the United States and the Caribbean (3)

289 Seminar: Modern China (3)

297 Readings in International Affairs (1, 2, or 3)

299–300 Thesis Research (3–3)

ligion

fessor R.G. Jones (*Chairman*)
ciate Professors H.E. Yeide, Jr., Dewey Wallace, Jr.
tant Professors Sonya Quitslund, A.J. Hiltebeitel
tant Professorial Lecturer M.S. Halpern

Bachelor of Arts with a major in Religion (Field-of-Study).—The following re-ements must be fulfilled:
The general requirements as stated on pages 78, 83–88.
Prerequisite courses—Rel 9, 10, and 59–60.
The coordinated field of knowledge upon which the student will be examined for major examination at the end of the senior year includes the history and litera- of the world's religions and the philosophical and ethical problems of religious ught. A student may elect to give special emphasis in his program to Christianity, ism, or the religions of India. A proseminar (Rel 199–200) assists the student preparing for the major examination. A pamphlet containing a detailed de- ion of the major is available in the offices of the Dean of Columbian College Arts and Sciences and the Chairman of the Department of Religion.
ster of Arts in the field of Religion.—Prerequisite: the degree of Bachelor of with a major in Religion from this University, or an equivalent degree.
uired: the general requirements, pages 93–100. Of the 24 semester hours of ired courses (exclusive of the thesis), at least 12 must be in third-group Religion ; **a maximum of 9 may be in a closely related field outside the Department** gion as approved by the Department. The Master's Comprehensive Examina- must cover three fields (the thesis research must be on one of these three fields) sen from the following: the Old Testament, the New Testament, History of anity, History of Religion in America, Modern Religious Thought, Ethics, ology of Religion, and History of Religions. A reading knowledge examina- sually in French or German, is required; however, Hebrew or Greek is ac- ble for those students whose thesis area is in the Biblical field and Sanskrit or stern language for those whose thesis area is in the History of Religions.
ster of Arts in the field of Religious Education.—Prerequisite: the degree of elor of Arts with a major in Religion from this University, or an equivalent ion. The undergraduate program should have included the following courses ivalent: Anth 1; Educ 108; Psyc 1, 22, and 29; Sp&D 1 or 11.
uired: the general requirements, pages 93–100. Of the 24 semester hours of ired courses (exclusive of the thesis), at least 6 must be in third-group Religion

courses; a maximum of 12 may be in a closely related field outside the Departm of Religion as approved by the Department.

*Master of Arts in the field of Religion and Medical Care**.—Prerequisite: (1) degree of Bachelor of Arts with a major in Religion from this University, or equivalent degree; (2) a first professional theological degree; or (3) accepta academic work required of entering medical students who have not earned Bachelor's degree, but who are pursuing the degree of Doctor of Medicine.

Required: the general requirements, pages 93–100. The program of study consi of 36 semester hours of approved course work with or without a thesis. Stude must elect course work covering four fields selected from Clinical Pastoral Ca Religion, Sociology, Psychology, Health Care Administration, and Medicine T course work in these fields must be distributed as follows: 12 semester hours ea selected from two fields and at least 6 hours in Clinical Pastoral Care. The Maste Comprehensive Examination must cover three fields selected from the list abo one of which, as approved by the Department, must be outside of the Departme of Religion. Supervised clinical education may be offered as a tool subject in l of the required reading knowledge examination in a foreign language.

Doctor of Philosophy in the field of American Religious History (offered in operation with the Department of History).—Required: the general requirement pages 93–97, 100–102. The General Examination must cover four fields, including t from the Department of Religion (History of Religion in America and either Eu Christianity or European Christianity since 1500) and two from the Departme of History (generally American Social History and one other).

FIRST GROUP

9 The Old Testament (3) Jones, Quitslu

Historical and literary study of the Old Testament with consideration development of religious ideas, institutions, and outstanding personalit (Fall)

10 The New Testament (3) Jones, Quitslu

Study of New Testament literature from the standpoint of occasion, pu pose, dominant ideas, and permanent values. Emphasis on approa structure, and significance of the Gospels and Epistles. (Spring) Yal

21 Introduction to Religious Thought (3)

Traditional religious concepts, language of contemporary religion and modern scientific and secular intellectual tendencies, and the place of r ligion in today's society. (Fall and spring)

59–60 History of Religions (3–3) Wallace, Hiltebeit

Origins, evolution, and contemporary status in historical context. Rel 5 primitive religion and the religions of the East (Hinduism, Buddhi Taoism, Confucianism, Shinto). Rel 60: religions of the West and No East (ancient religions, Judaism, Christianity, Islam). (Rel 59 a 60—fall and spring)

SECOND GROUP Quitslu

103 The Prophets (3)

Development of prophetism in the Old Testament; cultural, economi

* Certain courses in this program are offered only through Off-campus Centers of the College of General Studies.

psychological, and religious factors; elements of lasting value in the prophetic teaching. Study of selected prophets. (Fall)

104 **The Life and Thought of Jesus** (3)

Comprehensive study of the life and teachings of Jesus with critical attention to sources.

105 **The Life and Thought of Paul** (3)

Backgrounds of early Christianity, first-century religious and social conditions affecting the spread of Christianity, the life and journeys of Paul, Paul's presentation of the Christian faith.

122 **Christian Ethics and Modern Society** (3)

Nature and principles of Christian life as developed by the Christian community; problems of personal conduct; application to family, social, and economic institutions.

124 **Contemporary Movements in Theology** (3) Quitslund

Theological approach and systems of a selected number of modern theologians. (Spring)

126 **Western Mysticism** (3) Quitslund

Study of the phenomenon of religious experience and of selected mystics in Judaism, Christianity, and Islam. (Spring)

127 **Medicine, Religion, and Healing** (1) Staff

Total care concept. Importance of religion in medical practice for patient and physician. Concept of the professional man, the clergy's role in healing, religious perspective on issues in medical ethics. (Spring)

131 **History of Christianity to the Reformation** (3)

Rise and expansion of Christianity, development of Christian thought, and evolution of church organization and worship.

132 **History of Modern Christianity** (3)

Origin and development of Protestantism; Roman Catholic revival; status of Eastern churches; doctrines, worship, expansion, church and state, and relation to modern thought and life.

135 **History of Judaism to the Talmud** (3) Halpern

History and religious thought of the Jewish people from the Maccabean revolt to the compilation of the Talmud. (Fall)

136 **History of Medieval and Modern Judaism** (3) Halpern

History and religious thought of the Jewish people from the compilation of the Talmud to the present. (Spring)

137 **The Land of Israel and the Growth of the Western Religions** (6) Jones, Halpern

141–42 **Religious Education** (3–3)

Religious education in the home, church, and community; basic educational procedures and special techniques; organization and administration.

159 **Hinduism** (3) Hiltebeitel

Emergence of the structures of Hindu life and thought out of ancient

Vedic religion, religious philosophy, role of Hinduism in Indian civili
tion. (Fall)

160 **Buddhism** (3)
Origin, development, and contemporary status of Buddhist life
thought; its impact on Asian civilization. (Spring)

161 **Islam** (3)
Origin, development, and contemporary status of Islamic life and thou
its impact on the Near East.

162 **Symbolism in the History of Religions** (3)
Religious symbolism, myth, legend, and ritual in the religions of
world; various theoretical analyses. (Spring)

172 **Religion in American Culture** (3)
Growth of religious bodies and institutions in relation to American
ture, development of religious thought, and analysis of the contempo
religious scene. (Fall)

199–200 **Proseminar: Readings for the Major** (3–3)
Readings and group discussions. (Academic year)

THIRD GROUP

209–10 **Seminar: Biblical Studies** (3–3)
Main problems of Biblical literary, historical, and theological critic
(Academic year)

213 **Seminar: Inter-testamental Judaism** (3)
Historical and religious development of Judaism as seen in the Apocry
Pseudepigrapha, Dead Sea Scrolls, Philo, and early Rabbinism.

*216 **Supervised Clinical Pastoral Education (I–A)** (6)
Full-time program of clinical pastoral education in an approved cen
Involvement in the responsibility for pastoral ministry is reviewed
evaluated in a peer-group context.

*217 **Supervised Clinical Pastoral Education (I–B)** (6)
Continuation of Rel 216 with emphasis on pastoral and personal iden
sustained pastoral relationships, and pastoral methods and skills.

*218 **Supervised Clinical Pastoral Education (III–A)** (6)
Responsibility in pastoral ministry is increased with emphasis on gr
work, interprofessional involvement, use of specific counseling meth
work with persons with special problems. Prerequisite: Rel 216 and
or equivalent.

*219 **Supervised Clinical Pastoral Education (III–B)** (6)
Continuation of Rel 218 with emphasis on examination and revie
administrative procedures, design of pastoral programs, and develo
ment of pastoral theology.

* Offered through the College of General Studies at Off-campus Centers for students in the Ma
degree program in the field of Religion and Medical Care.

222 **Seminar: Christian Ethics** (3)

Important tendencies in ethical reflection of the contemporary Christian Church; contributions of social sciences to that reflection.

*225 **The Dynamics of Ministering to the Young Adult** (3)

Conceptual models of development of young adults from late adolescence; special problems of educational and military experience, vocational choice, marriage and the family, and physical, intellectual, emotional, and religious development. Encounter experience with persons and groups.

*227–28 **Advanced Studies in Pastoral Care** (3–3)

History and present state of methodologies and conceptual models of pastoral counseling and leadership in groups; supervised work in interfaith and multidisciplinary ministries. (Academic year)

231 **Seminar: Early Christianity** (3)

Selected topics.

232 **Seminar: Christianity since 1500** (3) Wallace

Selected topics. (Spring)

235 **Seminar: Roman Catholicism in the Modern World** (3) Quitslund

Important leaders and their ideas in selected developments since 1500—doctrinal, spiritual, biblical, liturgical, and ecumenical. (Fall)

237 **Seminar: Theological Analysis** (3)

Historical and topical study of the development of important ideas in such areas as Christology, soteriology, and ecclesiology.

241–42 **Seminar: Religious Education** (3)

Major problems in the practice of religious education.

262 **Seminar: History of Eastern Religions** (3)

Selected topics.

271 **Seminar: American Religious History to 1830** (3)

Religious thought and life during the Colonial and early National period.

273 **Seminar: American Religious History since 1830** (3) Wallace

Religious thought and life from the Civil War to the present. (Fall)

291–92 **Readings and Research** (3–3) Staff

Investigation of special problems. (Academic year)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

Romance Languages and Literatures

Professors J.W. Robb, G.E. Mazzeo, J.A. Frey, J.L. Métivier, Jr., J.F. Burks (Chairman)

*Offered through the College of General Studies at Off-campus Centers for students in the Master's degree program in the field of Religion and Medical Care.

Associate Professors Mary Ann Coffland, Pilar Sáenz
Assistant Professors Elizabeth Neyman, G.P. Huvé, Julia Hicks, Maria W
meth, Anne-Marie Schmutz, Shirley Barnett, Ines Azar, J.M. Thibau

Bachelor of Arts with a major in (1) *French Language and Literature*, (
Spanish American Literature, (3) *Spanish Language and Literature*, or (4) a
approved combination selected from two of the preceding (1), (2), (3). fiel
(*Field-of-Study or Departmental*).—The following requirements must be fulfilled

1. The general requirements as stated on pages 78, 83–88. (Students should cons
the departmental adviser regarding courses to be taken in satisfying the requir
ments for "meaningful initiation" into the Social Studies and the Natural an
Mathematical Sciences.)

2. Prerequisite courses—Fren 1–2, 3–4, 9–10, or equivalent; or Span 1–2, 3–4
9–10, or equivalent.

3. Required introductory literature courses—Fren 51–52 or 91–92, or Span 51–5
or 91–92.

4. Required for the major:

Field-of-Study major—there is no specific program of courses; however, th
passing of the major examination is assumed to be a convincing demonstration tha
the student possesses the breadth, depth, and knowledge of his major in terms o
semester hours, courses, and grades. A proseminar in each of the major field
assists the student in his preparation for the major examination.

Departmental major—(a) 6 to 12 semester hours selected from Fren 10
108, 109–10, and 193; no more than 36 semester hours of second-group French
literature courses; or (b) 6 to 12 semester hours selected from Span 109–10, 19
and one other approved Spanish language course; no more than 36 semester hours
of second-group Spanish or Spanish American literature courses.

It is strongly recommended that students elect two courses in one other literature
outside of their major field.

Master of Arts in the fields of (1) *French Literature*, (2) *Spanish American
Literature*, and (3) *Spanish Literature*.—Prerequisite: the degree of Bachelor of
Arts in the appropriate field from this University, or an equivalent degree.

Required: the general requirements, pages 93–100. The program of study consists
of 24 semester hours of approved course work plus a thesis (equivalent to 6 se
mester hours), or with the approval of the Department a student may elect a
program of study consisting of 36 semester hours of approved course work without
a thesis.

Doctor of Philosophy fields of study in Romance Literatures.—Required: the
general requirements, pages 93–97, 100–102. There are four fields: French Literature;
Spanish Literature; Spanish American Literature; and any approved combination of
French, Spanish, or Spanish American Literature.

Bachelor of Arts in Education with teaching fields in French and in Spanish—
Prerequisite: the Education curriculum, pages 80–81.

Required: the French option or the Spanish option and the professional courses
listed on pages 113, 117–18, 119.

Placement Examinations: A student who has not been granted advanced standing
and who wishes to continue in college the language begun in high school must take
a placement examination before registration. Upon completion of the examination
assignment is made to the appropriate course.

FRENCH

Departmental prerequisite: Fren 3–4 or 6, or equivalent, is prerequisite to all sec
ond-group courses in French.

FIRST GROUP

1–2 **First-year French** (3–3) **Burks and Staff**

A year course: credit toward a degree at this University given on completion of Fren 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern French prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester. (Fren 1 and 2—fall and spring)

2x **First-year French** (3) **Staff**

Intensive course to which are assigned entering students whose placement tests show them inadequately prepared for the regular work of Fren 3. Meets 6 hours a week (3 hours of lecture, 2 hours of drill, 1 hour of laboratory) and carries 3 semester hours of credit. Fee, $265 (tuition fee of $240 plus additional fee of $25) plus laboratory fee, $17.50. (Fall)

3–4 **Second-year French** (3–3) **Thibault and Staff**

A year course: credit toward a degree at this University given on completion of Fren 4. Conversation, grammar, composition, reading in modern French prose, introduction to French civilization. Aural training, oral practice in language laboratory. Prerequisite: Fren 1–2, 2x, or two years of high school French. Laboratory fee, $17.50 a semester. (Fren 3 and 4—fall and spring)

6 **Second-year French** (6) **Thibault and Staff**

Lecture (3 hours), discussion (3 hours). Intensive course which covers material of Fren 3–4. Grammar review, reading, conversation. Prerequisite: two years of high school French with grades of *B* or better; Fren 2 or 2x. (Spring)

9–10 **French Conversation and Composition** (3–3) **Huvé and Staff**

Prerequisite: Fren 4 or equivalent and permission of instructor. (Fren 9 and 10—fall and spring)

12 **French Conversation and Composition (Intensive)** (6) **Huvé and Staff**

Intensive course which covers material of Fren 9–10. Laboratory fee, $25.

49 **French for Graduate Students** (0) **Staff**

For graduate students preparing for reading examinations. No academic credit. Tuition fee, $240. (Fall and spring)

51–52 **Survey of French Literature** (3–3) **Métivier and Staff**

Readings in French literature from the Middle Ages to the present. Lectures, readings, recitations, and informal discussions. (Fren 51 and 52—fall and spring)

91–92 **Analyse de texte** (3–3) **Thibault**

Methodology and vocabulary of literary criticism; application of principles of *explication de texte* to selections from prose, drama, and poetry from the Renaissance to the present. (Academic year)

SECOND GROUP

103 **Pronunciation and Intonation** (3) Huvé
Recommended for majors. (Fall)

108 **Cours avance de grammaire** (3) Thibault
(Spring)

109–10 **Advanced French Conversation and Composition** (3–3) Huvé
Fren 109: emphasis on diction. Fren 110: emphasis on style. Prerequisite: Fren 10 or equivalent and permission of instructor. (Academic year)

119–20 **French Literature of the Middle Ages and the Renaissance** (3–3) Métivier
Literary history and the development of ideas. *Les chansons de geste*, courtly literature, satire, the theater, lyric and didactic poetry; Rabelais, Montaigne, La Pléiade. Class analysis of texts, collateral readings.

121–22 **17th Century French Literature** (3–3) Staff
History, philosophy, criticism, letters, eloquence, drama, fiction, poetry. Class analysis of texts; collateral readings. (Academic year)

123–24 **18th Century French Literature** (3–3) Schmutz
History, philosophy, criticism, letters, drama, fiction, poetry, the "salons," idea of progress, idea of science. Class analysis of texts, collateral reading.

125–26 **19th Century French Literature** (3–3) Frey
Poetry, drama, and novel of the 19th century with emphasis on stylistic analysis. Offered in English translation, 1972–73 and alternate years; offered in French, 1973–74 and alternate years. (Academic year)

127–28 **20th Century French Literature** (3–3) Thibault, Coffland
Fiction, poetry, and drama from 1900 to present. Chronological examination of authors, movements. Offered in French, 1972–73 and alternate years; offered in English translation, 1973–74 and alternate years. (Academic year)

129–30 **Contemporary French Literature** (3–3) Frey, Burke

193 **Cours de style** (3) Staff
Advanced grammar, composition, and stylistics. Open to both advanced undergraduate and graduate students. Recommended for majors and teachers of French.

199–200 **Proseminar: Readings for the Major** (3–3) Staff
Conferences and group discussions. (Academic year)

THIRD GROUP

202 **Theme et Version** (3) Schmutz
Limited to students in the Graduate School of Arts and Sciences; open to others only by permission of the graduate adviser. Required of graduate students in the field of French Language and Literature. Analysis and translation of selected prose, passages, alternating between French

and English; designed to teach students to write with precision and clarity. (Fall)

212 **Historical French Grammar** (3) Staff

Phonology, morphology, and syntax of Old French; its development from Vulgar Latin. Prerequisite: a second-group course in French literature. Knowledge of Latin useful.

213–14 **Medieval French Literature** (3–3) Staff

French literature to the end of the Middle Ages. Prerequisite: a second-group course in French literature. (Fall)

221 **Special Problems in 16th Century French Literature** (3) Burks

226 **16th and 17th Century Philosophical Literature** (3) Burks

The emergence of a literature of ideas; emphasis on the thought of Calvin, Montaigne, Descartes, and Pascal.

229–30 **Literary Renaissance in Europe** (3–3) Burks

Study of the developments in the poetry of Italy, France, and England. (Academic year)

231–32 **Theatre in the 17th Century** (3–3) Staff

Survey of the development of theatrical arts and the drama. Research papers and reports. (Academic year)

234 **17th Century Nondramatic Literature** (3) Staff

Rationalism and the revolt against authority expressed in literature. Impact of nondramatic literature on the development of classical doctrine.

241 **The Rationalistic Current in the 18th Century** (3) Schmutz

The contribution of the *philosophes* to the intellectual evolution of France and Europe. (Spring)

242 **Seminar: the French Novel in the 18th Century** (3) Schmutz

244 **Special Problems in 18th Century French Literature** (3) Schmutz

253 **Special Problems in 19th Century French Literature** (3) Frey

(The novel before 1857—fall; the novel after 1857—spring)

256 **19th Century French Literature** (3) Frey

258 **Special Problems in 19th Century French Poetry** (3) Frey

264 **Seminar: Modern Period** (3) Coffland

265 **20th Century French Theater** (3) Coffland

266 **20th Century French Poetry** (3) Coffland

Background and development of poetry in the 20th century; *explication de texte* approach.

295 **Independent Reading and Research in French Literature** (arr.)

For students preparing for the Master of Arts degree. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff
(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit (Fall and spring)

ITALIAN

FIRST GROUP

1–2 **First-year Italian** (3–3) Wilmeth and Staff
A year course: credit toward a degree at this University given on completion of Ital 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern Italian prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester. (Academic year)

3–4 **Second-year Italian** (3–3) Wilmeth and Staff
A year course: credit toward a degree at this University given on completion of Ital 4. Conversation, grammar, composition, reading in modern Italian prose, introduction to Italian civilization. Aural training, oral practice in language laboratory. Prerequisite: Ital 1–2 or two years of high school Italian. Laboratory fee, $17.50 a semester. (Academic year)

9–10 **Italian Conversation and Composition** (3–3) Wilmeth (Academic year)
Prerequisite: Ital 4 or equivalent and permission of instructor.

51–52 **Introduction to Italian Literature** (3–3) Wilmeth
Prerequisite: Ital 4 or equivalent. (Academic year)

THIRD GROUP

295 **Independent Reading and Research in Italian Literature** (arr.)
For students preparing for the Master of Arts or Doctor of Philosophy degree. May be repeated for credit. (Fall and spring)

PORTUGUESE

FIRST GROUP

31–32 **Intensive Portuguese** (3–3) Staff (Academic year)
Prerequisite: knowledge of one other Romance language.

SPANISH

Departmental prerequisite: Span 3–4 or 6, or equivalent, is prerequisite to all second-group courses in Spanish.

FIRST GROUP

1–2 First-year Spanish (3–3) — **Barnett and Staff**

A year course: credit toward a degree at this University given on completion of Span 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern Spanish prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester. (Span 1 and 2—fall and spring)

2x First-year Spanish (3) — **Neyman and Staff**

Intensive course to which are assigned entering students whose placement tests show them inadequately prepared for the regular work of Span 3. Meets 6 hours a week (3 hours of lecture, 2 hours of drill, 1 hour of laboratory) and carries 3 semester hours of credit. Fee, $265 (tuition fee of $240 plus additional fee of $25) plus laboratory fee, $17.50. (Fall)

3–4 Second-year Spanish (3–3) — **Barnett and Staff**

A year course: credit toward a degree at this University given on completion of Span 4. Conversation, grammar, composition, reading of modern Spanish prose, introduction to Hispanic civilization. Aural training, oral practice in language laboratory. Prerequisite: Span 1–2, 2x, or two years of high school Spanish. Laboratory fee, $17.50 a semester. (Span 3 and 4—fall and spring)

6 Second-year Spanish (6) — **Neyman**

Lecture (3 hours), discussion (3 hours). Intensive, accelerated course which covers material of Span 3–4. Grammar review, reading, conversation. Prerequisite: two years of high school Spanish with grades of *B* or better, or grades of Honors or High Pass in Span 2 or 2x. (Spring)

9–10 Spanish Conversation and Composition (3–3) — **Hicks and Staff**

Prerequisite: Span 4 or equivalent and permission of instructor. (Span 9 and 10—fall and spring)

12 Spanish Conversation and Composition (Intensive) (6) — **Staff**

Intensive, accelerated course which covers the material of Span 9–10. Laboratory fee, $25.

49 Spanish for Graduate Students (0) — **Hicks**

For graduate students preparing for reading examinations. No academic credit. Tuition fee, $240. (Fall and spring)

51–52 Survey of Spanish Literature and Civilization (3–3) — **Barnett**

Social, artistic, and cultural background of Spanish literature. Lectures, readings, recitations, and informal discussions. (Academic year)

91–92 Explicación de textos (3–3) — **Sáenz**

Analytical introduction to Spanish and Spanish American literature. Method demonstrated and practiced on selected passages. (Academic year)

SECOND GROUP

109–10 **Advanced Spanish Conversation and Composition** (3–3) Mazzeo
Emphasis on diction and style. Prerequisite: Span 10 or equivalent and permission of instructor. (Academic year)

119–20 **Medieval Spanish Literature** (3–3) Staff
Survey by genre of the literature of the Middle Ages. (Academic year)

121–22 **Spanish Literature of the Golden Age** (3–3) Azar
Span 121: Renaissance and Baroque Spanish poetry, the Spanish *comedia*.
Span 122: narrative prose of the Golden Age.

123–24 **Cervantes: Don Quijote** (3–3) Azar
The *Quijote* and the novel as a literary genre: reality and fiction. (Academic year)

125–26 **Modern Spanish Literature** (3–3) Mazzeo
Prose, poetry, and drama of the 18th and 19th centuries. Class analysis of texts, collateral reading, lectures on literature and history. (Academic year)

127–28 **Contemporary Spanish Literature** (3–3) Sáenz
Prose and poetry of the 20th century. Class analysis of texts, collateral reading, lectures on literature and history.

129 **The Romantic Drama in Spain** (3) Mazzeo
Lectures on the Spanish Romantic Drama, class analysis of representative plays, collateral readings.

130 **The Modern Spanish Essay** (3) Mazzeo
Development of the Spanish essay from the 16th century; emphasis on the 18th and 19th centuries. Class analysis of texts, collateral reading, and lectures.

131 **The Generation of 1898** (3) Staff
Study of the various critical problems related to this renaissance of Spanish letters as a whole, and of its most representative figures and works

135 **The Spanish Theater of the Realist Period** (3) Staff
Study and analysis of the works of Ventura de la Vega, López de Ayala, Tamayo y Baus, Echegaray, and Pérez Galdós.

141 **Introduction to Spanish American Literature** (6) Robb
Highlights of Spanish American literature through the colonial and modern periods. Of special interest to majors in Latin American Studies.

151–52 **The Spanish American Novel** (3–3) Robb
Development of the novel in Spanish America. Lectures, collateral reading, and class analysis of texts.

155–56 **Spanish American Literature to 1880** (3–3) Robb
Literature of Spanish America from the colonial period to the latter part of the 19th century. Lectures, collateral reading, reports, and class analysis of important works. (Academic year)

157–58 **Spanish American Literature since 1880** (3–3) Robb

Literature of Spanish America from 1880 to the contemporary period. Lectures, collateral reading, reports, and class analysis of important works.

193 **Curso de estilo** (3) Staff

Advanced grammar, composition, and stylistics. Open to both advanced undergraduate and graduate students. Recommended for majors and teachers of Spanish.

197–98 **Proseminar: Readings for the Major in Spanish American Literature** (3–3) Robb

Recommended for all majors. Conferences and group discussions. (Academic year)

199–200 **Proseminar: Readings for the Major in Spanish Language and Literature** (3–3) Mazzeo, Sáenz

Recommended for all majors. Conferences and group discussions. (Academic year)

THIRD GROUP

215 **Old Spanish Language and Literature** (3) Staff

(Formerly Span 215–16 Old Spanish (3–3))

221 **Seminar: Cervantes' "Don Quijote"** (3) Azar

Cervantes' literary theories, the *Quijote* and its relations with the other *novelas cervantinas* as different modes of representing reality in literary fiction. (Fall)

224 **Seminar: Special Problems in Spanish Renaissance Literature** (3) Azar

(*La Celestina*—spring)

225 **Seminar: Special Problems in Golden Age Literature** (3) Azar

231 **Seminar: 18th Century Spanish Writers** (3) Mazzeo

Lectures and analysis of principal authors and works; relationships with subsequent literary movements.

242 **Seminar: Spanish Romanticism** (3) Mazzeo

Lectures and analysis of principal authors and works. Collateral readings. Problems of origins and developments.

244 **Seminar: Naturalism and the Spanish Novel** (3) Mazzeo

Development of Naturalism in 19th century Spain. Analysis of representative works of Pardo Bazán, Clarín, Blasco-Ibáñez, and others. (Fall)

246 **Seminar: Works of Galdós** (3) Staff

(Formerly Span 245–46 Seminar: Works of Galdós (3–3))

Ideological and stylistic analysis: relationship of his works to literary movements of the second half of the 19th century. (Spring)

248 **Seminar: Spanish Lyric Poetry of the 20th Century** (3) Sáenz
Stylistic analysis of the most significant poets from 1898 to the present (Spring)

250 **Novecentismo y Literatura de Entreguerras** (3) Sáenz
The prose writers: intellectualism and new forms of expression. (Spring)

251 **Seminar: Works of Unamuno and Ortega y Gasset** (3) Sáenz
Study of their thought: analysis and commentary on the texts.

252 **Spanish Literature since the Civil War** (3) Sáenz
Development of the Spanish novel in the last thirty years.

253 **Seminar: Studies in Modern Spanish American Poetry** (3) Robb

255 **Seminar: Studies in 20th Century Spanish American Theatre** (3) Robb
(Fall)

256 **Seminar: Studies in Mexican Narrative Prose** (3) Robb

261 **Seminar: Studies in Spanish American Essayists** (3) Robb
The Spanish American essay as an artistic form; selected modern essay
ists.

264 **Seminar: Studies in Recent Spanish American Fiction** (3) Robb
(Spring)

266 **Seminar: Alfonso Reyes** (3) Robb
Alfonso Reyes, the essayist-artist, poet, and complete humanist, as studied
in his various prose and poetic works.

287 **Seminar: Problems in Latin American Civilization** (3) Gordon
Interdisciplinary seminar partially guided by a specialist within the
methodology of his chosen discipline; each student writes a report on
some aspect of a selected key theme. Admission by permission of in
structor. (Spring)

295 **Independent Reading and Research in Spanish and Spanish American Literature** (arr.)
For students preparing for the Master of Arts degree. May be repeated
for credit. (Fall and spring) Staff

299–300 **Thesis Research** (3–3)
(Fall and spring)

FOURTH GROUP Staff

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general exam
ination. May be repeated for credit. (Fall and spring) Staff

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit
(Fall and spring)

rvice-Learning Program*

ofessor C.C. Mondale
istant Professor J.L. Tropea

e Service-Learning Program is intended to open up new curricular options, to roduce new flexibility into the University's use of the learning resources of the ashington area, and to serve as a base for further development of service-learning ivities. Currently, the academic sponsors of the Program are the departments Political Science and Sociology and the Program in Experimental Humanities.

COND GROUP

150 **Learning through Service (3 to 15)**
Open to juniors and seniors only. The student undertakes an assignment with an extramural sponsor (e.g., an urban agency, a community organization, a Congressman's office, etc.). Arrangements are made through a "contractual" agreement among the student, the extramural sponsor, and the Service-Learning Program, with the amount of credit depending upon the nature of the assignment. (Fall and spring)

no-Soviet Studies

e "Institute for Sino-Soviet Studies."

vic Languages and Literatures

rofessor Helen Yakobson
ociate Professors Nadine Natov, C.A. Moser (*Chairman*), G.A. Olkhovsky, W.W. Rowe, Irene Thompson
ociate Professorial Lecturer Juri Jelagin
istant Professors M.A. Kandel, Mary Miller

Bachelor of Arts with a major in Russian Language and Literature (Field-of-Study) or *Bachelor of Arts with a major in Russian Literature and Culture—in Translation (Field-of-Study).*—The following requirements must be fulfilled:
1. The general requirements as stated on pages 78, 83–88, and the passing of the major examination at the end of the senior year. The Department provides a proseminar to assist the student in his preparation for the major examination.
2. (a) *The Russian Language and Literature major*—A student electing this major is required to include in his first two years of study Slav 5–6 (preferred), or Slav 1–2 and 3–4, or equivalent; and Slav 91–92. By the end of the senior year the student will be expected to have a reasonable command of language skills and a grasp of the fundamentals of Russian structure, as well as a good foundation in Russian literature and culture.
(b) *The Russian Literature and Culture—in Translation major*—A student electing this major is required to include in his first two years of study Slav 47 and 49, or Slav 1–2 and 3–4, or equivalent; and Slav 91–92. By the end of the senior

* Administered by the Office of Program Development.

year the student will be expected to have a good grasp of Russian literature and th principles of literary criticism, as well as a general knowledge of Russian culture and history.

A student who is already proficient in Russian language or literature, may, upon passing an appropriate examination, waive any or all of the first-group language literature courses, as well as up to 6 semester hours of second-group courses.

Master of Arts in the field of Russian Language and Literature.—Two areas of concentration are offered: Russian literature or Russian language.

Prerequisite: the degree of Bachelor of Arts with a major in Russian Language and Literature or Russian Literature and Culture—in Translation from this University, or an equivalent degree. A student planning a concentration in Russian literature must have a good reading knowledge of the Russian language, a firm grasp of 19th and 20th century Russian literature, and an acquaintance with Russian history and culture. A student planning a concentration in Russian language must have a general knowledge of the structure of the Russian language, proficiency in oral and written expression, and an acquaintance with 19th and 20th century Russian literature.

Required: the general requirements, pages 93–100. The program of study consists of 24 semester hours of approved course work plus a thesis (equivalent to semester hours) or 36 semester hours of approved course work without a thesis (D Department may waive up to 6 semester hours in the 36-semester-hour program. Candidates electing the Russian literature concentration must include 6 semester hours of linguistics and at least 18 hours of literature; candidates electing the Russian language concentration must include 6 semester hours of literature and at least hours of language and linguistics. All candidates must pass a reading knowledge examination in either French or German and must pass a Master's Comprehensive Examination in their area of concentration.

Bachelor of Arts in Education with a teaching field in Russian.—Prerequisite: Education curriculum, pages 80–81.

Required: the Russian option and the professional courses listed on pages 117, 1

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination assignment is made to the appropriate course.

FIRST GROUP

1–2 First-year Russian (3–3) Yakobson and St

A year course: credit toward a degree at this University given on completion of Slav 2. Beginners' course in fundamentals of grammar and pronunciation. Laboratory fee, $17.50 a semester. (Slav 1 and 2—fall and spring)

3–4 Second-year Russian (3–3) Yakobson and St

A year course: credit toward a degree at this University given on completion of Slav 4. Prerequisite: Slav 1–2 or two years of high school Russian. Laboratory fee, $17.50 a semester. (Academic year)

5–6 Intensive Beginning Russian (6–6) Thompson

Classroom (10 hours), laboratory (1 hour). Beginners' intensive course in the fundamentals of Russian. Prerequisite to Slav 6: Slav 2 or Laboratory fee, $17.50 a semester. (Academic year)

7–8 Intensive Advanced Russian (6–6) Miller, Olkhovsky

Emphasis on vocabulary expansion, systematic review of Russian gra

mar. Prerequisite to Slav 7: Slav 4 or 6, or equivalent. Prerequisite to Slav 8: Slav 7. (Academic year)

9–10 **Intermediate Russian Conversation and Composition** (3–3) Staff

Listening comprehension; oral and written practice. Prerequisite: Slav 4 or 6, or permission of instructor. (Academic year)

31–32 **Elementary Polish** (3–3) Staff

A year course: credit toward a degree at this University given on completion of Slav 32. Beginners' course in the fundamentals of grammar and pronunciation. Laboratory fee, $17.50 a semester. (1972-73 and alternate years—academic year)

41–42 **Elementary Serbo-Croatian** (3–3) Staff

A year course: credit toward a degree at this University given on completion of Slav 42. Beginners' course in the fundamentals of grammar and pronunciation. (1973–74 and alternate years—academic year)

47 **Beginning Russian for Reading** (3) Staff

For students with little or no knowledge of Russian who wish to learn to read the language only. Credit assigned only after completion of Slav 49. No academic credit for graduate students. (Fall)

49 **Russian Reading** (3) Staff

Primarily for graduate students preparing for reading examinations in the natural and social sciences. No academic credit for graduate students. Prerequisite: Slav 47 or equivalent. (Spring)

71 **Introduction to Russian Civilization** (3) Olkhovsky

Survey of Russia's artistic, social, and cultural development. Lectures, discussion, visual aids—in English. (Fall)

91–92 **Introduction to Russian Literature** (3–3) Staff

Emergence and development of Russian literature and ideas from earliest times to the literary masterpieces of the 19th and 20th centuries—in English. (Slav 91 and 92—fall and spring)

SECOND GROUP

101–2 **Readings in Modern Russian** (3–3) Olkhovsky

Representative reading and translation of Soviet periodicals and selected texts in social sciences. Prerequisite: Slav 4 or 6, or equivalent. (Academic year)

109–10 **Advanced Russian Conversation and Composition** (3–3) Moser

Developing proficiency in oral and written expression. Prerequisite: Slav 10 or equivalent. (Academic year)

125 **Russian Linguistic Structure** (3) Thompson

Linguistic description of standard contemporary Russian. (Fall)

126 **Contrastive Russian-English Analysis** (3) Thompson

Introduction to the basic principles and methods of contrastive linguistics and their application to the analysis of Russian and English structure. (Spring)

128 **Dostoevsky, the Man and the Artist** (3) Natov

Sources and development of Dostoevsky's philosophical, religious, and aesthetic ideas. His influence on Russian and Western literature. Lectures, discussions, and reports—in English. (Fall)

131 **18th Century Russian Literature** (3) Moser

Survey course in the history of Russian literature from 1700 to approximately 1820—in English. (1972–73 and alternate years—fall)

141–42 **Russian Romanticism and Realism** (3–3) Natov

(Formerly 19th Century Russian Literature)

Masterpieces of Russian prose, poetry, and drama of the 19th century—in Russian. Prerequisite: Slav 4 or 6, or equivalent. (Academic year)

143–44 **The Russian Novel** (3–3) Rowe

Study of representative novels of the 19th and 20th centuries—in English (Academic year)

146 **The Russian Short Story** (3) Natov

(Replaces former Slav 145 The Russian Short Story of the 19th Century (3) and Slav 146 The Russian Short Story of the 20th Century (3))

Historical development of the Russian short story. Lectures, reports, and class analysis—in Russian. (Spring)

151 **Russian Symbolism** (3) Natov

(Formerly 20th Century Prerevolutionary Russian Literature)

Class analysis of selected texts. Recitations and reports—in Russian. Prerequisite: Slav 4 or 6, or equivalent.

152 **Russian Literature after the Revolution** (3) Natov

(Formerly Contemporary Russian Literature)

Russian literature from 1917 to the present; emphasis on poetry and drama. Analysis of of selected texts, reports—in Russian. Prerequisite: Slav 4 or 6, or equivalent.

153 **Turgenev** (3) Rowe

Reading and discussion of Turgenev's works. Emphasis on the novels; major short stories analyzed and some time spent on his plays and other prose works—in English.

156 **Leo Tolstoy, His Life and Works** (3) Natov

Evolution of Tolstoy's artistic and philosophical ideas. Tolstoy's impact on Russian literature and society. Lectures, reports, and classroom analysis of his major works—in English. (Spring)

157 **Nabokov** (3) Rowe

Reading and discussion of the major creative works. Russian roots, ordering of reality, sexual symbolism—in English. (Fall)

158 **Solzhenitsyn** (3) Natov

Reading and discussion of the most important stories, novels, and plays by the outstanding contemporary Russian writer—in English. (Spring)

161–62 **Russian Culture** (3–3) Olkhovsky

Survey of Russian cultural heritage from origins of ancient Russia to pres-

ent—in English. Lecture, recitation, discussion, and individual reports on assigned topics. (Academic year)

165 **Soviet Literature from the Revolution to World War II** (3) Kandel

Basic themes, issues, literary figures of the Soviet 1920's. The fate of literature and writers under increasing state control; Five-year Plan literature. Lecture, discussion, reports—in English. (Fall)

166 **Soviet Literature from World War II to the Present** (3) Kandel

Literature in wartime, under Stalinism, and in the "thaws." The new generation of dissident liberals and "underground" literature. Lecture, discussion, reports—in English. (Spring)

171 **The Russian Intelligentsia** (3) Olkhovsky

Main trends and figures in the evolution of Russian artistic and intellectual life of the 19th century—in English. Lectures, discussion, reports. (Fall)

193–94 **The Other Slavs: Their Literature—in English** (3–3) Kandel

(Formerly Introduction to Slavic (non-Russian) Literature—in English)

An examination of non-Russian Slavic literatures from their beginnings to the present day. Emphasis on themes, ideas, and styles peculiar to each literature. (Academic year)

197 **Methodology of Teaching Russian** (3) Yakobson

(Formerly Special Problems in Teaching Russian)

Discussion of methods, examination of textbooks, observation of classroom procedures. Prerequisite: 18 semester hours of Russian language. (Spring)

198 **Russian Stylistics** (3) Natov

Development of the Russian language, literary styles, and techniques: words and their aesthetic value, phraseological units, word order, phrase structure. (1972–73 and alternate years—spring)

199–200 **Proseminar: Readings for the Major** (3–3) Staff

Conferences and group discussions. (Academic year)

THIRD GROUP

215 **History of the Russian Language** (3) Thompson

Historical phonology and morphology of the Russian language. (1973–74 and alternate years—fall)

216 **Comparative Slavic Structure** (3) Thompson

(Formerly Comparative Slavic Phonology and Morphology)

Study of the phonology and morphology of Russian as compared with other Slavic languages. Knowledge of a Slavic language other than Russian is helpful, but not required. (1973–74 and alternate years—spring)

225 **Pushkin and the Poets of His Time** (3) Natov

Pushkin's predecessors; Pushkin's lyrics and dramas. Lermontov—the heir to Pushkin's poetic tradition. (1973–74 and alternate years—fall)

253 Seminar: Literary Criticism (3)
Study of leading Russian critics and their role in the development of R
sian literature; the emergence of various literary schools. (1973-
and alternate years—spring)

254 Seminar: Literary and Intellectual Currents of the 1860's (3) Mo
Discussion of literary and intellectual developments in the Russia of t
1860's. Course conducted in English; a reading knowledge of Russi
required. (1972–73 and alternate years—spring)

255 Seminar: Main Trends in 20th Century Russian Literature (3) Natu
Study of representative works since 1900; their artistic and social value
in Russian. (1972–73 and alternate years—fall)

299–300 Thesis Research (3–3)
(Fall and spring)

Sociology

Professors R.W. Stephens, I.H. Cisin, H.J. Parry (*Research*), R.G. Bro
(*Chairman*), T.F. Courtless, Jr.
Professorial Lecturers E.E. Jacobson, P.J. Palmer, H.L. Sheppard
Associate Professor Patricia Lengermann
Assistant Professors C.S. Harris, Phyllis Stewart, J.L. Tropea, Ruth Walla
H.J. Becker (*Visiting*)
Assistant Professorial Lecturers W.R. Throckmorton, Charlotte Anker, B
Dunning

Bachelor of Arts with a major in Sociology **(*Departmental*).**—The following
quirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should c
sult the departmental adviser regarding courses to be taken in satisfying the requ
ment for "meaningful initiation" into the Humanities and the Natural and Ma
matical Sciences.)

2. Prerequisite courses—Soc 1 and 61; Math 3 or two years of high sch
algebra, or equivalent.

3. Required courses in related areas: Stat 53 or 104; 12 semester hours in
of the following related social science fields: Anthropology, Economics, Geograp
History, Political Science, and Psychology; either Phil 121 or 151 and either
127 or 152.

4. Required courses in the major—Soc 141, 149; 18 additional semester hour
second-group Sociology courses.

Master of Arts in the field of Sociology.—Prerequisite: a Bachelor's degree w
a major in Sociology or in an approved related field. Applicants should pro
scores on the Graduate Record Examination, preferably including the Advan
Test in Sociology, and arrange for former professors to write letters of refere
to the Graduate School of Arts and Sciences.

Required: the general requirements, pages 93–100. The minimum requirem
consists of 24 semester hours of approved course work plus a thesis (equivalent
6 semester hours). With the approval of the Department, a student may elec
program of study consisting of 36 semester hours of approved course work with

esis. All degree candidates must include in their program of study Soc 230, 231, 239, and Stat 105; and the satisfactory completion of a Master's Comprehensive amination in three fields, including Sociological Theory, Sociological Research thods, and one selected from Deviance, Political Sociology, Sociology of Work, ban Sociology. All course work must be approved in advance by the adviser. didates must also fulfill the tool requirement by passing a reading knowledge amination in one foreign language or by satisfactorily completing the tool re- ement in either Statistics or computer programming

Doctor of Philosophy in the field of Sociology—Required: the general require- pages 93–97, 100–102. Students must pass the General Examination in four including Sociological Theory, Sociological Research and Methods, and two ted from Deviance, Political Sociology, Sociology of Work, Urban Sociology.

Departmental prerequisite: Soc 1 is prerequisite to all second- and third-group ses in Sociology.

ST GROUP

1 Introductory Sociology (3)

General principles of sociology; development of culture and personality, impact of groups and institutions on man's social behavior. Survey of fields within sociology. (Fall and spring)

2 American Social Problems (3)

(Formerly Introductory Sociology)

Analysis of major social problems confronting the United States; factors producing social problems, their nature and treatment. (Fall and spring)

51 Development of Social Thought (3)

Examination of concepts and theories relevant to the nature of society and human relationships from ancient writings to the 20th century. Prerequisite: Soc 1. (Fall and spring)

OND GROUP

110 The Sociology of Work (3) Brown

Introductory survey of industrial sociology; sociology of occupations and professions; industry-community relations; and analysis of large, complex organizations. (Spring)

124 Medical Sociology (3) Brown, Stewart

Social factors and processes related to the etiology and treatment of physical and mental illness; medical occupations and professions, medical organizations, problems of delivery of health care services. (Fall)

125 Sociology of Religion (3) Wallace, Yeide

Introduction to history of the discipline; analysis of reciprocal impact of secular upon religious and religious upon secular institutions. (Fall)

126 Urban Sociology (3) Stephens

Place of the city in larger society; growth of the city, problems of urban living, group life, personality, urban housing, city planning, and suburban development. (Fall and spring)

127 **Population Problems** (3) Stephens, Stew

Composition of populations, trends in population growth and popula pressure, factors producing population movements, effects of migrati population policies—eugenics and birth control. (Fall)

128 **Urban Problems and Policies** (3)

Seminar on urban problems and policies developed in response to the special focus on Washington, D.C.; students placed in Washing agencies; seminar sessions devoted to social-policy analyses of their periences. (Spring)

129 **Race and Minority Groups** (3) Walla

Analysis of relationships between dominant and minority groups in socie particularly in the United States; nature and range of problems; analy of the phenomenon of prejudice. (Fall and spring)

130 **Social Stratification** (3) Stephe

Analysis of distribution of resources and opportunities for participatio education, and social mobility in American society; international co parisons; analysis of public policies which affect these distribution (Spring)

132 **Political Sociology** (3) Becker, Lengermi

Analysis of problems involved in the study of power relations in socie distribution of power in society; types and processes of governme political participation and political mobilization. (Fall)

133 **Sociology of Education** (3) Stephens, Trop

Analysis of educational systems from institutional perspectives and agencies of socialization; relationships of education in general to socie including technological, communal, and subcultural components. (Fa

134 **Marriage and the Family** (3) Stephens, Throckmorto

Courtship as a social process, marriage and marital adjustment, develop ment of the family, parent-child relations, family problems, disorganiz tion, divorce, and family reorganization. (Spring)

135 **Juvenile Delinquency** (3) Courtless, Trope

Factors producing delinquency, juvenile detention, the juvenile cour training schools, treatment of offenders. (Spring)

136 **Criminology** (3) Tropea, Courtle

Nature and distribution of crime as related to the development and oper tion of criminal law and various social and legal institutions in urba society. (Fall)

Courtle

137 **Sociology of Law** (3)

Law as a social phenomenon and agency of social control. Problems legal concepts, doctrines, and institutions. Prerequisite: Soc 136. (Spri

Trope

139 **Society and the Deviant** (3)

Analysis of relationships of society, socialization, and deviancy. Social re sponses to deviancy and criminal offenders; rehabilitative programs community, courts, and schools. (Fall)

141 **Social Research Methods** (3) **Becker, Cisin, Stewart**

Introduction to scientific method in the development of social theory and the solution to social problems. Prerequisite: Stat 53 or 104. (Fall and spring)

143 **Social Movements** (3) **Becker, Harris**

General survey of the various forms of collective behavior (fads, panics, riots, social movements, etc.), and a more detailed study of the genesis, development, and decay of social movements and social revolutions. (Spring)

144 **Public Opinion and Mass Communication** (3) **Parry**

Communication process with emphasis on international communications, propaganda, and mass media; measurement of propaganda campaigns. (Fall)

147 **Complex Organizations** (3) **Stewart**

(*Formerly Organizational Theory and Behavior*)

Introductory survey of traditional, contemporary theories and research describing behavior in large, complex organizations and their impact on American social life. (Fall)

149 **Modern Sociological Theory** (3) **Wallace**

Systematic study of contemporary schools of sociological theory, both European and American development; evaluation of scientific contributions of each school. Prerequisite: Soc 61. (Fall and spring)

191 **Current Emphases in Sociology** (3) **Staff**

Analysis and evaluation of recent developments in the general field of sociology. Topic changes each year; may be repeated for credit. Topic for 1972–73: **Sociology of Women**—examination of the status, role, and conflicts of women in American society, including study of images and socialization of women, changing educational and occupational opportunities for women, laws pertaining to women, women's reconciliation of familial and career roles, industrial nations' governmental policies affecting women, and women's movements. (Spring)

THIRD GROUP

210 **Theoretical Foundations of Political Sociology** (3) **Lengermann**

Study of sociological perspectives on political processes; emphasis on concepts of power and authority, leadership, alienation, ideology, political socialization, and political change. (Fall)

211 **Seminar: Social Change** (3) **Lengermann**

A macro-social, comparative, and interdisciplinary analysis of the processes of social change leading to and resulting from urbanization. (Fall)

212 **Seminar: Political Processes** (3) **Lengermann**

Sociological studies of political processes: distribution of power; types and processes of government, policy formation, political socialization, participation, and mobilization. Prerequisite: Soc 210. (Spring)

220 **Religious Institutions in the United States** (3) Palmer, Ye

Structural variety of religious institutions and patterns of interaction tween religious and secular institutions in contemporary American (Spring)

227–28 **Seminar: Urban Social Problems** (3) Jacob

(*Replaces former Soc 227 Seminar: Sociology of Poverty and Soc Seminar: Urban Social Problems*)

Multidisciplinary seminar that probes the role of social institutions the perpetuation of inequality. The seminar builds each year on the tivity and conclusions of previous seminars, and stresses questions only of poverty and injustice in society but likewise the problems group life and learning within the seminar itself. Limited enrollme Admission by permission of instructor. (Soc 228—fall)

230 **Social Research Methods** (3) Cisin, Stew

Translation of concepts into indices; analysis and interpretation of search results, measurement, scales and scoring, hypothesis testing. requisite: Soc 141 or equivalent. (Fall and spring)

231 **Advanced Social Research Methods** (3) Cisin, Stew

Intensive study and evaluation of current trends in the methodology social research. Discussion on individual student projects and recen published research. Prerequisite: Soc 230. (Spring)

233–34 **Seminar: Theory Construction and Application** (3–3) Wall

Critical examination of the elements of current theories in the so sciences with the major objective of developing general principles theory construction; consideration of the functions of theory in so logical research. (1972–73 and alternate years—academic year)

235 **Seminar: General Systems Theory** (3) Troy

Interdisciplinary study of general systems theory. Systematic inquiry implications of a behavioral/systems approach to analysis and mana ment of societal problems, particularly urban problems. (Spring)

238 **Seminar: Development of Sociological Theory** (3) Lengerma

Intensive analysis of concepts and theories relevant to the nature society and human relationships from ancient writings to the 20th cent (Fall)

239 **Seminar: Modern Sociological Theory** (3) Wall

Intensive examination and evaluation of contemporary schools of so logical theory in Europe and America. An advanced analysis of theoret perspectives. Prerequisite: Soc 238. (Spring)

240 **Sociology of Occupations** (3) Brown, Ha

Analysis of occupational roles and structures; recruitment and train adjustment problems at various career stages; interrelationships stratification systems, life styles, and occupations. (Fall)

242 **Seminar: Problems in Medical Sociology** (3) Bro

Sociological analysis of various problems in the institution of medi e.g., delivery of health care services, interprofessional relationships, s munity mental health, etc. (Spring)

243 **Seminar: Industrial Sociology** (3) Sheppard, Harris, Stewart

Problems of organization of work in industry, government, business; problems of decision-making, recruitment, allocation of authority, informal organization, and inter-organizational relations. (Fall)

244 **Seminar: American Class Structure** (3) Stephens

Analysis of the class structure of American society in continuity and change. Critical review of theories of class, of the methodology of class, and of research reporting social and psychological correlates of class. (Fall)

248 **Seminar: Organizational Theory and Behavior** (3) Harris, Stewart

Advanced analysis of theory and behavior in complex organizations relative to defining organizations, examining basic social processes and their relationship to the cultural environment. (Spring)

*259 **Law and Criminology I: Search for the Causes of Criminal Behavior** (3) (Same as Law 475(2)) Courtless

*261 **Law and Criminology II: Society's Responses to the Criminal Offender** (3) (Same as Law 476 (2)) Courtless

*262 **The Police and the Community** (3) (Same as Law 477 (2)) Allen, Courtless

263 **Seminar: Law and Society** (3) Courtless

Selected problems in law as an instrument of social policy; emphasis on the organization of legal decision-making processes. (1972-73 and alternate years: spring)

295 **Research** (arr.) Staff

May be repeated once for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

FOURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Spanish

See "Romance Languages and Literatures."

* Students registering for Soc 259, 261, or 262 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour. For description of the courses, see the *National Law Center* catalogue.

Special Education

Professor Perry Botwin (*Chairman*), Bertice Cornish
Associate Professor R.S. Cottrell, Jr.
Assistant Professors M.G. Van Dyke, R.W. Prouty, Rita Ives
Assistant Professorial Lecturer M.M. McCoulskey
Instructors Miriam Barteaux, Mary Campbell, Florence Nikkel

Programs of study in Special Education leading to the degrees of *Bachelor of A in Education, Master of Arts in Education, Education Specialist,* and *Doctor Education* are offered by the School of Education (see pages 105–30).

SECOND GROUP

101 **Seminar: Dimensions of the Complementary Teaching Role** (3)
(*Formerly Seminar: an Overview of Special Education*)
Instructional experiences designed to refine the insights and competenc essential for successful operation of the complementary teaching mod (Fall)

102 **Teaching the Child with Special Needs: Techniques and Methods** (3)
Laboratory course taught in an elementary public school. Students serve and participate in a demonstration seminar conducted by the structor. Must be taken concurrently with S Ed 189. (Fall)

103 **Teaching the Child with Special Needs: Creative Programming** (3)
Continuation of S Ed 102. Concentration on the total programming the child with special needs. Must be taken concurrently with S Ed (Spring)

170 **Interpersonal/Intrapersonal Relationships for Teachers** (3)
Consideration of factors leading to successful interaction with childr (Fall)

189 **Preprofessional Internship in Special Education I** (3)
Supervised internship in school setting. Emphasis on intensive study a child with educational difficulties. Must be taken concurrently S Ed 102. (Fall)

190 **Preprofessional Internship in Special Education II** (3)
Observation and participation in various special education settings phasis on exposure to and familiarity with goals and programs of var special education models. Must be taken concurrently with S Ed (Spring)

197–98 **Special Study in Special Education** (3–3)
Individual or group study or research under the guidance of staff m bers. Program and conferences arranged with adviser. Admission permission of adviser. (Academic year)
Ives and S

199 **Practicum in Teaching Special Education** (6)
(*Formerly S Ed 290*)
Supervised student teaching of children identified as needing special cation services. Minimum of 350 clock hours required. Admission permission of instructor. (Spring)

200 **Understanding Young Exceptional Children** (3) Staff

Lecture and field experience. Basic concepts of early child development as applied to special education. (Fall)

RD GROUP

201 **Introduction to Special Education** (3) Botwin

Survey course to acquaint prospective teachers with special education and to help them become aware of the various educational modifications necessary to accommodate children in a school program. (Fall)

204 **Problems in Urban Education** (3) Prouty

Problems and issues in urban education; emphasis on factors affecting successful educational practice in low-income areas. Admission by permission of instructor. (Spring)

240 **Educational Programming for Children with Behavioral Problems** (3) Van Dyke

Analysis of educational provisions for children with behavioral problems through study of ecological considerations in the light of contemporary special education theory. (Fall)

241 **Preprofessional Internship: Children with Behavioral Problems** (6) Van Dyke, Campbell

Practicum experience early in the training sequence, consisting of observation of, and interaction with, children with behavioral problems. Under the direction of qualified teachers in a field setting. A minimum of 280 clock hours required. (Fall)

242 **Clinical Teaching of Children with Behavioral Problems** (3) Campbell

Lectures and discussions exploring various psychoeducational techniques of teaching children and adolescents with behavioral problems. (Fall)

250 **Specialized Techniques and Materials for Diagnostic-Prescriptive Teachers** (3) Nikkel

Selected materials and techniques used in diagnostic-prescriptive teaching. Must be taken concurrently with S Ed 252. Admission by permission of instructor. (Fall)

251 **Psychosocial Factors in Diagnostic-Prescriptive Teaching** (3) Prouty

Psychosocial factors significant in the process of diagnostic-prescriptive teaching. Admission by permission of instructor. (Fall)

252 **Professional Internship for Diagnostic-Prescriptive Teachers** (6) Prouty, Nikkel

Supervised school experience in diagnostic-prescriptive teaching. Must be taken concurrently with S Ed 250. Admission by permission of instructor. A minimum of 280 clock hours required. (Fall)

253 **The Humanizing Curriculum in Diagnostic-Prescriptive Teaching** (3) Nikkel

Curriculum concepts and modifications aimed at enhancing the classroom environment for learning and growth. Admission by permission of instructor. (Fall and spring)

260 **Diagnosis of the Educational Needs of Young Children** (3)

Lecture-demonstration course designed to explore the existing and exp mental diagnostic tools to aid in education planning for young childr Admission by permission of instructor. (Fall)

261 **Special Methods for Teaching Young Children** (3)

Study and laboratory practice in specialized techniques and materials young children. Students develop and experiment with new methods materials. Admission by permission of instructor. (Fall)

262 **Seminar: the Education of Young Exceptional Children** (3)

Weekly seminar dealing with concepts and topics pertinent to the educ tion of young exceptional children. Admission by permission of instru tor. (Spring)

263 **Introduction to the Education of the Severely and Multiply Handicapped** (3)

Survey of the characteristics and learning patterns of children with seve disabilities. Lecture and field experience. (Fall)

264 **Advanced Study in the Special Education of the Severely and Multiply Handicapped** (3)

Specialized programs, techniques, and methods for teaching children w severe disabilities. (Spring)

265 **Utilization of Supportive Personnel in Early Educational Programs for Exceptional Children** (3)

Methods and opportunities for the use of para-professionals, volunteer and parents in the education of young children wth special needs. (Spring)

266 **Problems in Language Development in Exceptional Children** (3)

Introduction to the study of language acquisition and the application current research on language of handicapped children. (Fall)

267 **The Role of the Early Childhood Special Educator** (3)

Examination of the spectrum of roles available in early childhood spec education; emphasis on role expectations and psychosocial dynamics the various settings. (Spring)

268 **Pre-school Planning for Children with Disabilities** (3)

Lecture and field experiences. Application of learning patterns to education of children with disabilities. (Fall)

269 **Clinical Teaching in Early Childhood Education** (3)

Supervised clinical internship in special education with young childre Admission by permission of instructor. (Fall)

270 **Adapting the Early Childhood Curriculum to Meet Special Needs** (3) — Staff

Review of the basic curriculum areas as they relate to the development of readiness skills in special education. (Spring)

*271 **Interdisciplinary Approach to Planning for the Severely or Multiply Handicapped** (3) — Cornish

Laboratory experience; students participate as educational members of an interdisciplinary team. (Fall)

289 **The Diagnostic Procedure** (3) — Ives

Examination of the rationale, techniques, and tools essential to academic and psychosocial assessment. Designed to provide practice as well as familiarity with the diagnostic procedure. Admission by permission of instructor.

291 **Practicum in Teaching Children with Behavioral Problems** (9) — Campbell

Supervised student teaching in programs for children with behavioral problems. Under the direction of a qualified teacher and the supervision of the University staff. Minimum of 420 clock hours required. (Spring)

292 **Practicum in Teaching Young Children in Special Education** (6) — Barteaux and Staff

Supervised student teaching in special education in classrooms for young children. Minimum of 350 clock hours required. (Spring)

294 **Practicum in Diagnostic-Prescriptive Teaching** (9) — Nikkel

Supervised field experience in diagnostic-prescriptive teacher programs. Minimum of 420 clock hours required. Admission by permission of instructor. (Spring)

297–98 **Individual Study in Special Education** (3–3) — Staff

Individual study or research under guidance of staff member. Program and conferences arranged with adviser. Admission by permission of adviser. (Academic year)

303 **Administration and Supervision of Special Education** (3) — Botwin

Philosophy and nature of special education; program organization, administration, and development. Surveying local-level needs; program evaluation and supervision. Admission by permission of instructor. (Spring)

304 **Recent Research and Trends in Special Education** (3) — Staff

Emphasis on research methodology and considerations. The unique problems of doing research in special education. Procedures and sources for obtaining research funding. Admission by permission of instructor. (Fall)

306 **Counseling Families of Children with Special Needs** (3) — Cornish

Working with parents and community agencies in meeting the educational and social needs of young children. Admission by permission of instructor. (Spring)

*To be held at Georgetown University Hospital.

308 **Instructional Media, Technology, and Education** (3)

Review of technological developments as they affect education
special education, including historical perspective; operating princip
of various kinds of hardware, including printing, audio-visual equipme
television, and computers. (Spring)

342 **Seminar: Crisis/Resource Teaching** (3)

Topics and concepts relevant to an exploration of alternative models
the education of children perceived as having learning/behavior pro
lems. Admission by permission of instructor. (Spring)

343 **Psychoeducational Diagnosis of Children** (3)

Lecture and laboratory course designed to develop *educational* strateg
for children who present behavior or learning problems in the schoo
Admission by permission of instructor. (Fall)

345 **Public School Consultation and Program Planning** (3)

Mental health consultation models in public schools, in-service train
programs for educational personnel, and special programming for ch
dren with behavioral problems in the schools. (Spring)

346 **Special Education Theory and Practice for School Administrators** (3)

Lectures and discussions to familiarize public school administrators
supervisors with contemporary special education theory and practice.
(Spring)

350 **The Diagnostic-Prescriptive Teacher** (3)

Rationale, operational models, techniques, and problems relevant to i
plementation of diagnostic-prescriptive teacher programs. Admission
permission of instructor. (Fall)

351 **Seminar for Diagnostic-Prescriptive Teachers** (3)

Current practices in regular and special education as they affect the d
nostic-prescriptive teacher; emphasis on concurrent field experience
mission by permission of instructor. (Spring)

370 **Intrapersonal Dynamics in Special Education** (3) Prouty, Van Dy

Small group exploration of intrapersonal factors essential to understa
ing roles and interpersonal techniques in teaching exceptional childr
Admission by permission of instructor. (Spring)

FOURTH GROUP

453–54 **Doctoral Internship: Special Education** (3–3)

Supervised professional internship in college teaching, administrati
supervision, or private agency function. Each internship individually
ranged. Admission by permission of adviser. (Academic year)

490 **Interrelated Doctoral Seminar: Special Education** (3)

Interrelated seminar for advanced doctoral students. Consideration
major issues of philosophy, policy, and practice in special education.
mission by permission of adviser. (Spring)

491 **Dissertation Research** (arr.)

(Fall and spring)

peech and Drama

ofessors G.F. Henigan (*Chairman*) (*Director of Forensics*), E.L. Stevens, J.W. Hillis (*Director of Speech Pathology and Audiology*)
ofessorial Lecturer Gilbert Herer
sociate Professors Lee Bielski, L.S. Bowling, Sr., W.M. Reynolds, S.G. James (*Director of Theatre*)
sistant Professors Joan Regnell, J.P. Fox, Diane Brewer, N.C. Garner
sistant Professorial Lecturers Leonard Biegel, Jacqueline Dudley
structors Dean Munroe, M.W. Naylor

Bachelor of Arts with a major in Dramatic Art (Departmental).—The following ...rements must be fulfilled:

The general requirements as stated on pages 78, 83–88. (Students should con... the departmental adviser regarding courses to be taken in satisfying the require... for "meaningful initiation" into the Social Studies and the Natural and ...thematical Sciences.)

2. Prerequisite courses—Sp&D 1, 11, 32.

3. Required courses in related areas—24 semester hours of second-group courses ...side the Department of Speech and Drama as approved by the major adviser. ...Courses in dramatic literature offered in the Classics, English, and foreign language ...rtments are strongly recommended.)

4. Required courses in the major—Sp&D 115, 151, 161–62, 165–66; 6 additional ...ester hours in second-group drama courses.

Bachelor of Arts with a major in Speech Communication (Departmental).—The ...owing requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should con... the departmental adviser regarding courses to be taken in satisfying the require... for "meaningful initiation" into the Social Studies and the Natural and Mathe... ...ical Sciences.)

2. Prerequisite courses—Sp&D 1, 11.

3. Required courses in related areas—6 semester hours in Psychology and 6 ...ester hours in Philosophy as approved by the major adviser; 12 to 18 semester ...rs in a single subject area outside the Department of Speech and Drama as ...roved by the major adviser.

4. Required courses in the major—Sp&D 112, 121, 126, 143, 144; 9 additional ...ester hours of second-group courses in the Department of Speech and Drama ...proved by the major adviser.

Bachelor of Arts with a major in Speech Pathology and Audiology (Depart...ental).—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should con... the departmental adviser regarding courses to be taken in satisfying the re... ...ements for "meaningful initiation" into the Social Studies and the Natural ... Mathematical Sciences.)

2. Prerequisite courses—Sp&D 1, 11.

3. Required courses in related areas—24 semester hours in courses outside the ...partment of Speech and Drama as recommended and approved by the major ...viser.

4. Required courses in the major—Sp&D 101, 171; 18 additional semester hours ... second-group courses in the Department of Speech and Drama as approved ... the major adviser.

Master of Arts in the field of Speech Pathology and Audiology.—Prerequisite: the ...gree of Bachelor of Arts with a major in Speech Pathology and Audiology from ...e University, or an equivalent degree, and the score on the Aptitude Test of the ...raduate Record Examination.

Required: the general requirements, pages 93–100. The program of study consists

of 24 semester hours of approved course work plus a thesis (equivalent to 6 sem ter hours), or with the approval of the Department, 36 semester hours of cou work without a thesis. All students must satisfy the academic and supervised pr ticum requirements for the Certificate of Clinical Competence awarded by t American Speech and Hearing Association, and they must include Sp&D 27 their program of study.

Master of Fine Arts in the field of Dramatic Art.—Prerequisite: the degree Bachelor of Arts from this University, or an equivalent degree.

Required: the general requirements, pages 93–100. The program of study cons of 24 semester hours of second- and third-group course work in drama and l matic literature plus the production and direction of a major three-act play, equi lent to 6 additional semester hours.

Bachelor of Arts in Education with a teaching field in Speech and Drama.—P requisite: the Education curriculum, pages 80–81.

Required: the Speech and Drama option and the professional courses listed pages 118–19.

Speech and Hearing Therapy: See Speech and Hearing Clinic, page 54.

FIRST GROUP

A American Speech for Foreign Students (3)

Class limited to foreign-born students. Instruction in the formation of sounds of spoken English, with emphasis on rhythm and inflection. In national Phonetic Alphabet used. Recording fee, $5. (Fall and spri

1 Communicative Speaking and Listening (3) Henigan and St

Basic theories and principles of speech communication; composition, livery, and criticism of speaking in interpersonal, group, and public uations. Recording fee, $2. (Fall and spring)

11 Voice and Diction (3) Bielski and St

Development of naturalness, correctness, and clarity in conversatio speech. Analysis and correction of individual speech delivery fa through tapes and weekly performances. Recording fee, $4. and spring)

32 Oral Interpretation of Literature (3) Garner, Mun

Theory and practice in discovering and communicating orally the m ing in literature through analysis of form and content. Techniques reading prose, poetry, and drama for listeners. Prerequisite: Sp&D Recording fee, $2. (Fall and spring)

45 Understanding the Theatre (3)

The art of the theatre: its literature, aesthetics, and mechanics. Co butions of the playwright, actor, director, and designer examined thro lectures, visiting artists, class discussions, and attendance at theatr performances. Primarily for nonmajors. (Spring)

49 Social Dynamics of Speech Communication (3)

A survey of speech communication techniques and rhetorical princi underlying social protest speaking. (Fall)

OND GROUP

101 **Acoustic Phonetics** (3) **Brewer**
(Formerly Phonetics)

Acoustics of speech production and perception; phonetics and phonemic transcription systems; their application in linguistic analysis with emphasis on disorders of speech and hearing. Laboratory fee, $17.50. (Spring)

111 **Business and Professional Speaking** (3) **Stevens**

Study of the communication process in business and professional speaking; practice in presenting technical reports; selling policies, programs, and services; interviews; conferences; speech in training and supervisory activities. Primarily for nonmajors. (Fall)

112 **Advanced Public Speaking** (3) **Henigan**

In-depth study of and practice in the principles and techniques of persuasive speaking, with emphasis on the psychological factors in audience analysis and adaptation. Prerequisite: Sp&D 1 or permission of instructor. (Spring)

115–16 **Acting** (3–3) **James**

Study and practice of fundamentals of acting technique: sense memory, improvisation, character analysis, role development. Prerequisite: Sp&D 32. (Academic year)

121 **Group Discussion and Conference Leadership** (3) **Stevens**

Process of thinking and problem-solving in committees and small groups; methods of leading discussions and conferences. Prerequisite: Sp&D 1 or permission of instructor. (Fall and spring)

125 **Training the Student Advocate** (3)

In-depth investigation into the theory and practice of coaching competitive forensics-debate, oratory, and extemporaneous speaking.

126 **Argumentation and Debate** (3) **Reynolds**

Study of the advocacy system; special emphasis on issue identification, use of evidence, and logical proof. Extensive practice in argumentative speaking. Prerequisite: Sp&D 1 or permission of instructor. (Spring)

127–28 **Advanced Debate Practice** (1–1) **Naylor**

Admission by permission of instructor, after one semester of satisfactory participation in intercollegiate debate program. May be repeated for a total of 4 semester hours. (Academic year)

133–34 **Radio and TV Broadcasting** (3–3) **Biegel**

Study of the development of radio and TV industries, station organization and management, equipment, production techniques; practice in preparation and performance of radio programs. Recording fee for Sp&D 134, $5. (Academic year)

135–36 **Radio Workshop** (1–1)

Practical work in campus radio station. Admission by permission of instructor, after one semester of satisfactory participation in WRGW activities. May be repeated for a total of 4 semester hours of credit. (Academic year)

143 **History and Criticism of European Public Address** (3) Reynol

Survey of speakers and rhetorical methods as they evolved in Weste European democracies from the classical period to the present time. (Fall)

144 **History and Criticism of American Public Address** (3) Reynol

Study of American oratory from its pre-Revolution origins to the pre ent day, interpreted in terms of issues and movements. (Spring)

151 **Stagecraft** (3) Munro

Lecture (2 hours), laboratory (1 hour). Theories and practicum in th technical aspects of production. (Fall)

152 **Advanced Stagecraft** (3) Munro

Lecture (2 hours), laboratory (1 hour). Theories and practicum i production, staging, and scenic design. Prerequisite: Sp&D 151 permission of instructor. (Spring)

154 **Play Directing** (3) Garst

Fundamentals of play directing. Studies in dramatic composition, cha acter analysis, casting, rehearsing, play analysis. Under supervision of structor, students cast and prepare scenes for presentation. Prerequisite Sp&D 115. Laboratory fee, $5. (Spring)

155–56 **Play Production Practice** (1–1) Staff

Practical work in theatre: assigned production duties, special projec under instructor's supervision. May be repeated for a total of 4 semest hours of credit. Admission by permission of instructor. (Academ year)

161–62 **Theatrical Styles** (3–3) Jame

Historical and critical study of significant plays and production metho Sp&D 161: to the Restoration. Sp&D 162: since the Restoration. (Academic year)

165–66 **History of the Theatre** (3–3) Garst

An examination of the development and growth of the theatre from beginnings to the present. Sp&D 165: Greek through Restoration. Sp 166: the 18th century to the present. (Academic year)

169 **Introduction to Creative Dramatics** (3) Jame

Study of philosophies and practices underlying dramatics with childre materials and methods for conducting improvised dramatic activities elementary and secondary education. (Fall)

171 **Bases of Speech and Hearing** (3) Hill

Structural and functional foundations of speech production and recepti (Spring)

172 **Speech Pathology I** (3) Regn

Pathologies and therapeutic procedures in articulatory and voice d orders and cleft palate. Prerequisite: Sp&D 101, 171. (Fall)

173 **Speech Pathology II** (3) **Fox**

Pathologies and therapeutic procedures in stuttering and disorders of central or peripheral nervous systems. Prerequisite: Sp&D 101, 171. (Fall)

176 **Speech, Hearing, and Language Development** (3) **Fox**

Study of normal speech and auditory function from prenatal development through the emergence of language. (Spring)

182 **Introduction to Audiology** (3) **Brewer**

Overview of the field of audiology to include a review of sound and its properties, anatomy and physiology of auditory system, and methods and procedures of pure tone and speech audiometry. Prerequisite: Sp&D 101, 171. (Fall)

183 **Clinical Procedures in Speech and Hearing** (3) **Regnell**

Method, theory, and practice in preparation of therapeutic objectives and materials; practice and observation in speech and hearing evaluation. Prerequisite: Sp&D 172 or 182. (Fall and spring)

184 **Clinical Practice in Speech and Hearing** (arr.) **Staff**

Supervised case work in speech and hearing in the University Speech and Hearing Clinic and selected off-campus facilities. May be repeated for a total of 3 semester hours. Prerequisite or concurrent registration: Sp&D 183. (Fall and spring)

188 **Aural Rehabilitation** (3) **Brewer**

Systems, principles, and methods of auditory training and speech reading, including development of lesson plans and their application in resolving communication problems of acoustically-handicapped individuals. Prerequisite: Sp&D 182. Laboratory fee, $7.50. (Fall)

*192 **The American Cinema** (3) **Staff**

History and criticism of American films. At least one film will be shown each week, on which there will be readings, discussions, and lectures. The course will enable the student to develop an ability to see and evaluate cinema techniques, to express the evaluation clearly in writing, and to understand the role of films in the context of American culture.

193 **Design** (3) **Munroe**

Fundamental study of principles and concepts of theatre design. (1972–73 and alternate years—fall)

195 **Costuming** (3) **Staff**

Study of costume history, materials, and construction. (Fall)

THIRD GROUP

215–16 **Advanced Acting** (3–3) **James**

Study of character analysis, transactional analysis, exercise principles, improvisation, and styles. (1972–73 and alternate years—academic year)

* Joint offering of the Department of Speech and Drama and the American Studies Program. Students may register under either designation.

Munroe

251 Advanced Design (3)

Fundamental study of principles and concepts of theatre design. (1972–73 and alternate years—spring)

Staff

252 Advanced Costuming (3)

Study of costume history, materials, and construction. (Spring)

Garner

255 Lighting (3)

Theory and practice of stage lighting. (Fall)

James

256 Advanced Directing (3)

Play analysis, character analysis; directing of scenes and one-act plays under supervision. (Spring)

James

257 Modern Trends (3)

Study of recent trends in theatrical criticism, theory, and play production. (1972–73 and alternate years—fall)

Staff

258 Theatre Management (3)

Theory and practice in the psychology of handling the public: promotion, box office and house management. Admission by interview.

Hillis

275 Research Methods in Speech Pathology and Audiology (3)

Clinical interpretation of research literature in speech pathology and audiology; application of research methodology in the management of speech, language, and hearing disorders. (Fall)

Staff

277 Advanced Clinical Procedures in Speech and Hearing (arr.)

(Fall and spring)

Staff

278 Advanced Clinical Practice in Speech and Hearing (arr.)

(Fall and spring)

Bowling

279 Anatomy and Physiology of Speech and Hearing (3)

Study of structures and pathologies of speech and hearing. Laboratory fee, $15. (Fall)

Fox

280 Neurological Speech and Language Disorders (3)

Evaluation and therapy for speech and language disorders resulting from neurological pathology: aphasia, apraxia, dysarthria, and related disorders. Laboratory fee, $7.50. (Fall)

Bowling

281 Advanced Clinical Audiology (3)

Principles and methods underlying assessment of auditory disorders; emphasis on bone conduction, masking, and speech intelligibility. Clinical implications, tests, demonstration, and practicum. Laboratory fee, $7.50. (Fall)

Bowling

282 Special Auditory Tests (3)

Special speech and pure tone audiometric techniques for differentiating conductive, cochlear, and retro-cochlear lesions, for identifying functional hearing losses. Clinical application of tests and interpretation of results. Laboratory fee, $7.50. (Spring)

283 **Community Programs in Speech and Hearing** (3) Herer

Methods and procedures for management of hearing and speech programs; review of hearing conservation and monitoring programs and operational aspects of clinical programs. Laboratory fee, $7.50. (Fall)

284 **Disorders of Articulation** (3) Hillis

Consideration of pathologies and treatment of disorders of speech articulation; emphasis on current treatment procedures. Laboratory fee, $7.50. (Spring)

285 **Hearing Aids** (3) Brewer

Discussion of hearing-aid characteristics and electroacoustic measurements; hearing-aid effectiveness in improving communicative efficiency; procedures for selection and clinical evaluation of hearing aids; counseling of the patient. (Spring)

286 **Disorders of Voice and Resonance** (3) Hillis

Consideration of pathologies and treatment of disorders of voice and resonance; emphasis on current treatment procedures. Laboratory fee, $5. (Fall)

288 **Psychosocial Aspects of Hearing Loss** (3) Bowling

Consideration of the rationale and procedures for evaluating the social and emotional behavior as well as the intellectual potential of those with impaired hearing. Laboratory fee, $7.50. (Spring)

291 **Seminar: Speech Pathology** (3) Staff

Current topics in speech and language pathology. May be repeated for credit. (Spring)

292 **Seminar: Audiology** (3) Staff

Offered in such areas as theories of audition, special auditory tests, aural rehabilitation, psychoacoustics. May be repeated for credit. (Spring)

293 **Stuttering and Related Disorders** (3) Hillis

Consideration of pathologies and treatment of dysrhythmic speech function; emphasis on current treatment procedures. (Fall)

294 **Independent Research in Dramatic Art** (arr.) Staff

May be repeated for credit. (Fall and spring)

295 **Independent Research in Speech and Hearing** (arr.) Staff

May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) Staff

(Fall and spring)

Statistics

Professors E.H. Johnson (*Emeritus*), H.F. Bright, Solomon Kullback (*Emeritus*), H.W. Lilliefors, A.D. Kirsch, Herbert Solomon (*Chairman*), R.H. Shumway

Professorial Lecturers Samuel Greenhouse, Morton Kupperman, W.W. Wolman
Associate Professor C.T. Ireland
Associate Professorial Lecturers M.A. Schwartz, R.L. Beatty
Assistant Professors R.E. Thomas, C.R. Mann
Adjunct Assistant Professor J.K. Kern
Assistant Professorial Lecturer Fred Frishman
Lecturers William Rutiser, T.C. Teeples, C.H. Allen

Bachelor of Arts or *Bachelor of Science with a major in Applied Statistics (Departmental)* or *Mathematical Statistics (Departmental).*—The following requirements must be fulfilled:

1. The general requirements as stated on pages 78, 83–88. (Students should consult the departmental adviser regarding courses to be taken in satisfying the requirements for "meaningful initiation" into the Humanities and Social Studies.)

2. Prerequisite courses for both majors—Math 31, 32, 34; Stat 91, 97.

3. (a) Required course in related areas for the Applied Statistics major—Math 124. (Courses in computer science and some field of application are recommended. Foreign language is not required for this major.)

(b) Required courses in related areas for the Mathematical Statistics major—Math 124, 139, 140, 157; two years of introductory French, German, or Russian or equivalent. (Courses in computer science, mathematics, and some field of application are recommended.)

4. (a) Required courses in the Applied Statistics major—Stat 113, 117, 118, 157–58, 159, 189; plus three approved second-group courses in Statistics.

(b) Required courses in the Mathematical Statistics major—Stat 117, 118, 157–58, 189–90; plus three approved second-group courses in Statistics.

To assure a balanced program, departmental approval of electives is required for both majors.

Master of Science in the field of Applied Statistics or *Master of Arts in the field of Mathematical Statistics.*—The program of study consists of 30 semester hours of course work without a thesis. In exceptional cases the Department may approve a program of study consisting of 24 semester hours of course work plus a thesis, equivalent to 6 additional semester hours. Candidates must pass a written Master's Comprehensive Examination and must fulfill the tool requirement by passing either a reading knowledge examination in an acceptable foreign language or an examination in computer language. The successful completion of course work in computer programming does not obviate the requirement to pass a special examination should the computer option be elected as a tool. For prerequisites and additional requirements, see below.

Master of Science in the field of Applied Statistics.—Prerequisite: a Bachelor's degree with a major in Applied Statistics from this University, or an equivalent degree. If undergraduate study did not include equivalent required courses at this University, those courses must be taken as prerequisite to graduate study.

Required: the general requirements, pages 93–100, including 18 semester hours of Statistics and 12 additional hours of approved course work in an area of interest to the candidate. Courses are selected in consultation with the adviser.

Master of Arts in the field of Mathematical Statistics.—Prerequisite: a Bachelor's degree with a major in Mathematical Statistics from this University, or an equivalent degree. If undergraduate study did not include equivalent courses at this University, those courses must be taken as prerequisite to graduate study.

Required: the general requirements, pages 93–100, including Stat 201–2 or 257–58, and 217–18. The remaining 18 semester hours must be selected in consultation with the adviser.

Doctor of Philosophy in the field of Mathematical Statistics.—Prerequisite: the degree of Master of Arts in the field of Mathematical Statistics from this University, or an equivalent degree.

Required: the general requirements, pages 93–97, 100–102. A minimum of 24 semester hours of course work must be taken in residence at this University before the General Examination may be completed. The General Examination consists of an oral examination following four days of written examinations: Part I—Matrix Algebra, Real and Complex Analysis; Part II—Probability; Part III and Part IV—Mathematical Statistics. The first two parts of the General Examination may be taken after successful completion of Stat 259-60 or its equivalent; the third and fourth parts may be taken after completion of Stat 257–58, 263–64, 265–66, and a 3-semester-hour seminar. The tool requirement may be fulfilled by passing a reading knowledge examination in two foreign languages or by a combination of passing a reading knowledge examination in one foreign language and an examination in computer language. The successful completion of course work in computer programming does not obviate the requirement to pass a special examination should the computer option be elected as a tool.

Research Fields: Biometrics, Design of Experiments, Econometrics, Information Theory, Multivariate Analysis, Operations Analysis, Sampling, and Statistical Inference.

Departmental prerequisite: One entrance unit in algebra is prerequisite to all first-group courses in Statistics.

FIRST GROUP

49 The Language of Statistics (0) — **Staff**

For M.A. and Ph.D. students in the Graduate School of Arts and Sciences as a minimum option in lieu of a foreign language. No academic credit. Tuition fee, $240.

***51 Introduction to Business and Economic Statistics (3)** — **Staff**

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, time series, index numbers. Laboratory fee, $13. (Fall and spring)

***52 Mathematics of Finance (3)** — **Johnson**

Interest and discount, annuities, valuation of stocks and bonds, sinking funds, amortization, valuation of depletable assets, depreciation. (Spring)

***53 Introduction to Statistics in Psychology and Education (3)** — **Staff**

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, analysis of variance. Laboratory fee, $13. (Fall and spring)

***91 Principles of Statistical Methods (3)** — **Staff**

Lecture (3 hours), laboratory (1 hour). Variables and attributes, averages and dispersion, frequency distributions and their characteristics, regression and correlation, statistical decision processes. Laboratory fee, $13. (Fall and spring)

97 Introduction to Computer Programming (3) — **Thomas and Staff**

Lecture (2 hours), laboratory (2 hours). Computer and programming

* Stat 51, 53, and 91 are related in their subject matter, and credit hours for only one of the three may be applied toward a degree. Stat 52 lies outside of this group, and may be taken for degree credit in combination with any one of the other three.

concepts. High-level language programs written by students will be run on the University computer. Laboratory fee, $25. (Fall and spring)

SECOND GROUP

*104 **Statistics in the Behavioral Sciences and Education I** (3) Staff

Lecture (3 hours), laboratory (1 hour). Introductory study of statistical techniques for research problems in behavioral sciences and education. Laboratory fee, $13. (Fall)

105 **Statistics in the Behavioral Sciences and Education II** (3) Kirsch

Lecture (3 hours), laboratory (1 hour). Advanced study of statistical techniques for research problems. Analysis of variance, correlation techniques, chi-square applications, sampling theory. Prerequisite: Stat 53 or 104. Laboratory fee, $13. (Fall and spring)

107 **Statistics for Engineers** (3) Staff

Probability models, discrete and continuous distributions, sampling, hypothesis testing and estimation, engineering applications. Prerequisite: differential and integral calculus.

109–10 **Quality Control and Reliability Techniques** (3–3)

Statistical methods and probability models for quality control and reliability applications. Prerequisite: Stat 91 or 107.

111 **Business and Economic Statistics I** (3) Johnson

Statistical processes as tools in decision-making in areas of economics and business. Admission by permission of instructor. (Fall)

112 **Business and Economic Statistics II** (3) Johnson

Case work to illustrate quantitative procedures for solution of economic and business problems. Prerequisite: Stat 111 or equivalent. (Spring)

113 **Computer Programming** (3) Thomas and Staff

Lecture (2 hours), laboratory (2 hours). Computer concepts beyond the introductory level; an introduction to assembly language and advanced high-level language programming. Prerequisite: Stat 97. Laboratory fee, $25. (Spring)

114 **Introduction to Computer Operating Systems** (3) Thomas and Staff

Design and implementation of operating systems, program editing and loading, supervisory routines, input-output control, multi-programming scheduling systems, future trends. Prerequisite: Stat 113. Laboratory fee, $25. (Spring)

115 **Programming Languages** (3) Thomas and Staff

Concepts of programming languages, compiler techniques, nonnumeric programming. Prerequisite: Stat 113 or permission of instructor. Laboratory fee, $25. (Fall)

117 **Analysis of Variance** (3) Staff

Lecture (3 hours), laboratory (1 hour). Introduction to the design of experiments and analysis of variance; random block, factorial, Latin square, and analysis of covariance. Prerequisite: Stat 118. Laboratory fee, $13. (Fall)

* May not be taken for credit by students who have received credit for Stat 51, 53, or 91.

118 **Regression Analysis** (3) **Staff**

Lecture (3 hours), laboratory (1 hour). Regression and correlation theory; simple, partial, and multiple. Prerequisite: 3 semester hours selected from Stat 51, 53, 91, 104, 107. Laboratory fee, $13. (Fall)

119 **Bases of Statistical Decision-making** (arr.) **Kern**

For students in the Navy Graduate Financial Management Program only. Introduction to techniques of decision-making, with emphasis on applications rather than theory.

122 **Forecasting Principles and Techniques** (3) **Johnson**

Survey and appraisal of current economic forecasting techniques and indicators of business conditions. Preparation of an actual forecast. Prerequisite: Stat 51 or equivalent.

*123 **Introduction to Econometrics** (3) **Bennett**

Construction and testing of economic models: regression theory, parameter estimation, and statistical techniques applicable to economic models. Empirical work by the student required. Prerequisite: Econ 101, 102, and a one-year sequence in calculus. (Fall or spring)

131 **Contingency Table Techniques** (3) **Kullback**

Analysis of multidimensional contingency tables, including estimation, tests of hypotheses, and log-linear regression. Prerequisite: Stat 118 or permission of instructor. (Fall)

155 **Introduction to Probability** (3) **Staff**

Probability distribution, Bayes' theorem and postulate, mathematical expectation, laws of large numbers. Prerequisite: one entrance unit in algebra.

157–58 **Introduction to Mathematical Statistics** (3–3) **Staff**

Distribution theory, sampling theory, estimation, hypothesis testing, regression analysis, experimental design. Prerequisite: differential and integral calculus. (Academic year)

159 **Principles of Bayesian Statistics** (3) **Mann**

Lecture (3 hours), laboratory (1 hour). Probability as a measure of uncertainty of knowledge; concepts and techniques of Bayesian inference. Prerequisite: 3 semester hours in introductory statistics, or equivalent. Laboratory fee, $13. (Fall or spring)

161–62 **Information Theory** (3–3) **Kullback**

Elementary development of information theory and applications to communication, coding, psychology, linguistics, etc. Prerequisite: 3 semester hours selected from Stat 107, 155, 157, 159, 189.

165–66 **Multivariate Techniques** (3–3) **Staff**

Application of multivariate statistical techniques to multidimensional research data from the behavioral, social, biological, medical, and physical sciences. Prerequisite: Stat 117, 157–58; Math 124. (Academic year)

* An interdepartmental course offered by the departments of Statistics and Economics.

183 **Intermediate Statistical Laboratory** (3) Staff

Applications to advanced experimental design and other topics. Admission by permission of instructor. (Fall or spring)

187 **Theory of Sampling** (3) Staff

Problems of sampling and sample design. Prerequisite: Stat 91 or equivalent. (Fall)

188 **Nonparametric Statistical Inference** (3) Lilliefors

Statistical inference when the form of underlying distribution is unspecified. Prerequisite: Stat 91 or equivalent. (Spring)

189–90 **Mathematical Probability and Applications** (3–3) Staff

Combinatorial analysis, conditional probability, stochastic independence, probability distributions, random variables, laws of large numbers. Prerequisite: differential and integral calculus. (Academic year)

191 **Probabilistic Methods for Operations Research** (3) Staff

Primarily for students in the School of Engineering and Applied Science. Axiomatic theory, random variables, Bayes' theorem, some special distributions, generating functions, convergence, Poisson and Markov processes. Prerequisite: Ap S 115 or equivalent. (Fall)

192 **Statistical Methods for Operations Research** (3) Staff

Primarily for students in the School of Engineering and Applied Science. Sampling, estimation, sampling distributions, hypothesis testing, the general linear hypothesis, experimental design models, elements of sequential analysis and nonparametric statistics. Prerequisite: Stat 191 or equivalent. (Spring)

193–94 **Statistical Models in Behavioral Sciences** (3–3) Solomon

Analysis of models in factor analysis, mental testing, social and psychological processes, equilibrium states, Poisson processes, etc. Prerequisite: Stat 157–58, 189–90.

195 **Reading and Research in Statistics** (arr.) Staff

May be repeated once for credit. (Fall and spring)

197 **Digital Computer Programming with Applications** (3) Thomas

Lecture (2 hours), laboratory (2 hours). Use of digital computer in statistical and other computational work. Writing, debugging, and running programs on the digital computer in the University Computer Center. Prerequisite: Stat 117; or Math 32; or permission of instructor. Laboratory fee, $25. (Spring)

THIRD GROUP Staff

201–2 **Mathematical Statistics** (3–3)

Distribution theory, sampling theory, estimation, sufficient statistics, hypothesis testing, analysis of variance, multivariate normal distribution. Prerequisite: advanced calculus. (Academic year) Kiefer

206 **Factor Analysis** (3)

(Formerly Stat 106)

Concepts of factor analysis and their utility in various phases of research

and related topics. Prerequisite: Stat 105 or equivalent. Laboratory fee, $13. Not open to graduate students in Statistics.

207–8 **Operations Analysis** (3–3) **Staff**

Basic concepts and techniques. Introduction to simulation, linear programming, game theory, queuing theory, inventory theory, and other topics. Admission by permission of instructor. (Academic year)

217–18 **Advanced ANOVA and Experimental Design** (3–3) **Staff**

Advanced theory and application of general linear hypothesis to experimental designs. Prerequisite: Stat 157–58 or 201–2; and Math 124. (Academic year)

221 **Design of Experiments for Behavioral Sciences and Education** (3) **Kirsch**

(Formerly Stat 121)

Applications of advanced experimental design to research problems in behavioral sciences and education. Prerequisite: Stat 105 or 117 and permission of instructor. Not open to graduate students in Statistics. (Spring)

231 **Contingency Table Analysis** (3) **Staff**

A study of the theoretical bases underlying the analysis of categorical data. Prerequisite: Stat 201–2 or 257–58.

257–58 **Distribution Theory** (3–3) **Staff**

Random variables, distribution functions, moments, sequences of random variables, characteristic functions, special distributions, sampling theory, asymptotic distributions. Prerequisite: Stat 157–58 or 201–2; and Math 124, 139, 140, 157, 250.

259–60 **Advanced Mathematical Probability** (3–3) **Staff**

Measure theory, probability spaces, random variables, probability distributions, sequences of random variables, conditioning, martingales. Prerequisite: Stat 189–90 and Math 250. (Academic year)

261–62 **Geometrical Probability and Applications** (3–3) **Solomon**

Distribution of points in Euclidean space, random lines in a plane or space, convergence, random packing, integral geometry, and convex plane figures and surfaces. Applications in astronomy, physics, biology, chemistry, traffic, etc. Prerequisite: Stat 189–90, 201–2. (Academic year)

263–64 **Topics in Statistical Inference** (3–3) **Staff**

Estimation, testing of statistical hypotheses, tests of significance, likelihood ratio, Bayesian inference and the use of prior knowledge, decision and information theory. Prerequisite: Stat 257–58; or Stat 201–2 and Math 124. (Academic year)

265–66 **Multivariate Analysis** (3–3) **Staff**

Tests of significance, homogeneity, independence, canonical and vector correlations, multivariate normal distribution, generalized Student's ratio, multivariate linear hypothesis, and analysis of variance. Prerequisite: Stat 257–58; or Stat 201–2 and Math 124. (Academic year)

267–68 **Characteristic Functions** (3–3) **Staff**

Fourier integrals, distribution functions, inversion formulas, limit theo-

rems, applications to the distribution problem of statistics. Prerequisite: Stat 189–90; 201–2 or 257–58; and Math 157.

269–70 **Statistical Decision Theory** (3–3) Staff

Wald's theory of decision functions. Sequential analysis. Multi-decision problems. Existence theorems, complete class theorems, and other general decision theoretic results. Prerequisite: Stat 189–90; and 201–2 or 257–58.

271–72 **Statistical Information Theory** (3–3) Kullback

Informational properties of sub-sigma-algebras of the fundamental probability space. Prerequisite: Stat 201–2 or 257–58; and 259–60. (Academic year)

273–74 **Markov Processes** (3–3) Lilliefors

Fundamental notions of Markov chains and processes, generating functions, recurrence, limit theorems, random walks, Poisson processes, birth and death processes, applications. Prerequisite: Stat 189–90; and 201–2 or 257–58.

*275 **Econometrics I: Introduction** (3) Peskin, Bennett

Single equation models of economic behavior and associated econometric problems. Use of statistical methods for testing economic hypotheses and estimating parameters. Problems stemming from the use of nonexperimental data. Introduction to simultaneous equations problems. Empirical work by student required. Prerequisite: Econ 101, 102; Stat 157–58 or equivalent; or permission of instructor. (Fall)

*276 **Econometrics II: Simultaneous Equations Models** (3) Bennett

Continuation of Stat 275. Economic models and simultaneous equations systems. Identification of parameters, least squares bias, and alternative estimation methods. Block recursive systems. Prerequisite: Stat 275. Recommended: a course in matrix theory. (Spring)

281–82 **Time Series Analysis** (3–3) Shumway

Stationary and nonstationary time series, auto- and cross-correlation, power spectral analysis, multivariate normal processes, mean square estimation and regression, statistical inference, applications. Prerequisite: Stat 189–90; and 201–2 or 257–58. (Academic year)

283 **Advanced Statistical Laboratory** (3) Staff

Application of the University computer to complex statistical problems on an individual study basis. Admission by permission of instructor. Laboratory fee, $25. May be repeated for credit only with permission of the Department. (Fall and spring)

285–86 **Seminar** (3–3) Staff

Admission by permission of instructor. (Stat 285 and 286—fall and spring)

295 **Reading and Research** (3) Staff

May be repeated once for credit. (Fall or spring)

* An interdepartmental course offered by departments of Statistics and Economics.

296 **Seminar: Data Analysis Methods** (3) **Staff**
(Formerly Seminar: Professional Consulting in Statistics)
Case studies, data analysis procedures, and problems that a consultant might encounter.

297 **Problems in Mathematical Statistics** (3) **Staff**

298 **Seminar: Combinatorial Probability** (3) **Staff**

299–300 **Thesis Research** (3–3) **Staff**
(Fall and spring)

FOURTH GROUP

*378 **Seminar: Topics in Econometrics** (3) **Staff**
Limited to graduate students, primarily for doctoral candidates; offered as demand requires. A research seminar covering current econometric literature and special topics. Admission by permission of instructor.

398 **Advanced Reading and Research** (arr.) **Staff**
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) **Staff**
Limited to Doctor of Philosophy candidates May be repeated for credit. (Fall and spring)

Urban and Regional Planning

Professor D.C. McGrath, Jr. (*Chairman*)
Professorial Lecturers Norman Beckman, G.E. Kostritsky
Associate Professorial Lecturers S.J. Bellomo, C.G. Turner, R.E. Bonz
Assistant Professors Sherwin Greene, S.S. Fuller

Programs of study in Urban and Regional Planning leading to the degrees of *Master of Urban and Regional Planning, Master of Arts in Government, Master of Public Administration, Doctor of Business Administration,* and *Doctor of Public Administration* are offered by the School of Government and Business Administration (see pages 131–60).

SECOND GROUP

153 **Principles of Urban Planning and Design** (3) Greene
Studio course for undergraduates. Basic elements of urban planning and design applied to community problems. Survey of planner's role in developing and implementing creative solutions to urban problems.

THIRD GROUP

201 **Introduction to Urban Planning** (3) McGrath, Fuller
Introduction to history, concepts, and activities of urban planning. Discussion of trends in urbanism and the influences of technical and social change. (Fall and spring)

203 **Fundamentals of Urban Design** (4) Greene

Planning and design studio to develop and apply planning methods and graphic techniques, principles of land use and urban design; analysis of factors affecting community development and change. Open only to candidates for the degree of Master of Urban and Regional Planning. (Fall)

204 **Urban Development Planning** (4) Greene

Planning and design studio: investigation of social, environmental, and technological factors in planning. Application of comprehensive planning process to typical problems of community growth and development. Prerequisite: U&RP 203 or permission of instructor. Laboratory fee, $10. (Spring)

205 **Urban Housing** (3) Fuller

Examination of the housing problem: housing market characteristics, analytical techniques, national needs, costs, financing, federal programs, technology, rehabilitation, and policy formulation. Prerequisite: U&RP 201. (Fall and spring)

206 **Community Facilities Planning** (3) Fuller

Examination of planning implications of essential public facilities which comprise community infrastructure. Emphasis on developing an understanding of the special design, service, and locational requirements of each class of community facility, the relationships among facilities, and their direct and indirect effects on urban development and the community at large. Prerequisite: U&RP 201 or permission of instructor. (Fall

207 **Land Development Planning** (3) McGrath

Selected problems in urban and regional planning: applications of zoning, urban renewal, and special programs available for the implementation of development plans. Prerequisite: U&RP 201. (Spring)

208 **Urban Transportation Planning** (3) Bellomo

Relationships between land use and the movement of goods and people in urban areas. Transportation planning principles, policy problems, methods for analyzing demand and systems for urban travel, and roles of public agencies and private interests in planning and development of various modes. Prerequisite: U&RP 201. (Fall)

209 **Urban Transportation Models** (3) Turner

Consideration of land use activity, trip generation and distribution, modal choice models, traffic assignment, and decision-making techniques. Review of detail studies, calibration, interactions, applications, and accuracy limitations of various mathematical models. Prerequisite: U&RP 208; basic statistics; or permission of instructor.

210 **Urban Development Economics** (3)

Economic forces affecting urban growth and change; relationships among cities, metropolitan areas, and regions in the context of the national economy; socioeconomic implications of urban land development policies; basic studies and methods of economic analysis. Prerequisite: U&RP 201. (Spring)

215 **Advanced Planning Problems** (4) McGrath and Staff

Investigation of complex problems of the metropolitan region, analysis of findings, formulation of proposals, and presentation of material to faculty and cooperating groups. Multidisciplinary team and individual planning projects. Studio course. Prerequisite: U&RP 204. Laboratory fee, $10. (Fall)

218 **Metropolitan and Regional Planning** (3) Fuller and Staff

Multidisciplinary study of the methods of regional analysis and process of regional planning; development of projects of regional scale requiring problem analysis, synthesis, and plan formulation. Studio course. Prerequisite: U&RP 204 or permission of instructor. Laboratory fee, $10. (Spring)

221 **Land Development Law** (3) (Same as Law 501)

For description of the course, see the *National Law Center* catalogue.

*222 **Land Use Planning** (3) (Same as Law 571 (2))

240 **Federal and State Urban Policy Development** (3) Beckman

Investigation of contemporary trends in the evolution of federal and state governmental functions and programs affecting urban growth and development policy. Planning function in the evolving relationships between units of federal, state, and metropolitan agencies. (Fall)

295 **Urban Research** (3) Staff

Directed research and investigation of special problems in community development. May be repeated once for credit. (Fall and spring)

299 **Thesis Seminar** (3) Staff

Examination of thesis standards, research philosophy, and methodology. (Fall and spring)

300 **Thesis Research** (3) Staff
(Fall and spring)

OURTH GROUP

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Business Administration or Doctor of Public Administration general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Business Administration or Doctor of Public Administration candidates. May be repeated for credit. (Fall and spring)

oology

e "Biological Sciences."

Students registering for U&RP 222 make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour. For description of the course, see the *National Law Center* catalogue.



FACULTY AND STAFF OF INSTRUCTION

COLUMBIAN COLLEGE OF ARTS AND SCIENCES

GRADUATE SCHOOL OF ARTS AND SCIENCES

SCHOOL OF EDUCATION

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

EMERITI

Caroline Lander Adams, *Professor Emeritus of Botany*
B.A. 1925, Illinois College; M.S. 1928, University of Chicago; Ph.D. 1932, University of Wisconsin, Madison

Everett Cyril Albritton, *Professor Emeritus of Physiology*
B.A. 1916, University of Missouri, Columbia; M.D. 1921, Johns Hopkins University

Ruth Harriet Atwell, *Professor Emeritus of Physical Education for Women*
Ph.B. 1918, Denison University; M.A. in Ed. 1933, George Washington University

Gretchen Rogers Bolwell, *Professor Emeritus of German*
B.A. 1930, M.A. 1931, George Washington University; Ph.D. 1938, Johns Hopkins University

Robert Whitney Bolwell, *Professor Emeritus of American Literature*
B.A. 1916, Case Western Reserve University; M.A. 1917, Ph.D. 1921, Columbia University; Litt.D. 1957, George Washington University

Paul William Bowman, *Professor Emeritus of Biology*
B.A. 1924, University of Pennsylvania; M.A. 1928, George Washington University; Ph.D. 1930, University of Virginia

Elizabeth Burtner, *Professor Emeritus of Physical Education, in Residence*
B.A. 1927, Hood College; M.A. 1935, Columbia University

Richard Bernard Castell, *Director Emeritus of the Student Health Service*
B.A. 1932, M.D. 1935, George Washington University

Elbridge Colby, *Professor Emeritus of Journalism*
B.A. 1912, M.A. 1913, Ph.D. 1922, Columbia University

Oswald Symister Colclough, *Professor Emeritus of Law; Dean of Faculties Emeritus; Emeritus Director of the Patent, Trademark, and Copyright Research Institute*
B.S. 1920, U.S. Naval Academy; LL.B. 1935, Sc.D. 1961, George Washington University; LL.D. 1946, Muhlenberg College

Alan Thomas Deibert, *Professor Emeritus of Romance Languages*
B.A. 1918, Gettysburg College; M.A. 1922, Harvard University

William Webster Diehl, *Professor Emeritus of Mycology*
B.A. 1914, Miami University; M.S. 1915, Iowa State University of Science and Technology; Ph.D. 1932, Harvard University

William Rankin Duryee, *Research Professor Emeritus of Pathology (Experimental), in Residence*
B.S. 1927, Ph.D. 1933, Yale University

James Harold Fox, *Professor Emeritus of Education*
B.A. 1925, M.A. 1926, University of Western Ontario, Canada; Ed.M. 1936, Ed.D. 1937, Harvard University

Frederick Harrell Gibbs, *Professor Emeritus of Health Care Administration*
B.S. 1958, University of Maryland; M.H.A. 1959, University of Minnesota, Minneapolis-St. Paul

Thomas Willard Holland, *Professor Emeritus of Labor Economics*
B.A. 1923, University of Michigan; LL.B. 1934, Columbia University; Ph.D. 1939, University of Wisconsin, Madison

Averett Howard, *Professor Emeritus of English Composition*
B.A. 1922, University of California, Berkeley; M.A. 1940, Cornell University

Thelma Hunt, *Professor Emeritus of Psychology, in Residence*
B.A. 1924, M.A. 1925, Ph.D. 1927, M.D. 1935, George Washington University

Herbert Jehle, *Professor Emeritus of Physics*
Dr. Ing. 1933, Institute of Technology, Berlin

Everett Herschel Johnson, *Professor Emeritus of Statistics, in Residence*
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* On leave of absence 1972-73.

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On sabbatical leave fall semester 1972.

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B.S. 1964, Syracuse University; M.B.A. 1968, Florida State University

John Carl Lowe, *Assistant Professor of Geography and Regional Science*
B.A. 1958, M.A. 1960, George Washington University; Ph.D. 1969, Clark University

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B.S. 1956, Columbia University; M.D. 1960, Case Western Reserve University

William Allan MacDonald, *Professor of Art and Archeology*
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Ph.D. 1937, Pazmany University, Hungary

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Charles Roy Mann, *Assistant Professor of Statistics*
B.S. 1961, Polytechnic Institute of Brooklyn; M.S. 1963, Michigan State University; Ph.D. 1969, University of Missouri, Columbia

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* On sabbatical leave fall semester 1972.

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Mus.B. 1930, University of Kansas, M.S. in Mus. 1949, Union Theological Seminary

[1] On sabbatical leave 1972-73.
[2] On personal leave spring semester 1973.
[3] On sabbatical leave fall semester 1972.

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B.A. 1939, M.A. 1940, Ph.D. 1946, University of Wisconsin, Madison

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APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety of the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property, or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate* and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 19, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs† of The George Washington University as soon after order is restored as is practicably possible.

* The University Senate has been renamed the Faculty Senate.
† The duties and functions of the Hearing Committee on Student Affairs are now performed by the Joint Committee of Faculty and Students.

The following resolution, submitted by the Student Life Committee, was proved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its tradition commitment to freedom of expression (a) by continuing to permit business g government organizations which are recruiting employees to conduct their act ities at designated places on campus, and (b) by placing no obstacle to stude who may wish to protest the presence of such recruiters, provided, howev that such protest shall be orderly and shall not impede or disrupt the recrui in his activities.

The University affirms its place as a forum for the free exchange of ideas (by assuring that guests invited to speak on this campus at duly scheduled me ings shall have the right to appear and to be heard, and (b) by sanctioning t freedom of students to express dissent from the views of the speaker, provid however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-o struction; it accepts the former as a legitimate expression of dissent while r jecting the latter as an abridgement of the freedoms of the individuals who m be its object.

The following was approved by the University's Board of Trustees on Octob 19, 1968:

The George Washington University is opposed to discrimination based o race, color, or creed. Such discrimination may have appeared in campus orga izations in the past. In the future, however, no organization can be recogniz or supported by the University unless it provides continued assurance of no discrimination in membership practices and in intent, considered adequate relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on Octob 19, 1968:

The University cannot condone violations of law, including violation of thi laws which proscribe possession, use, sale, or distribution of certain drug Members of the academic community should know that administrative actio which may include dismissal from the residence halls, revocation of other priv leges, or suspension or dismissal from the University, may be taken in order t protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and th Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved b the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, research and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the niversity,

ay be punished for his conduct by dismissal from the University, or by some ther disciplinary action, through procedures established within the University r the government of its members.

In order to insure due process, any student subject to dismissal or other disinary action on the grounds of violating any of the premises of this resolu- shall have, at his discretion, the right of review of the action by the Univer- Hearing Committee on Student Affairs.*



* The duties and functions of the Hearing Committee on Student Affairs are now performed by the Joint Committee of Faculty and Students.


VERSITY JOSEPH
NATIONAL ACADEMY OF SCIENCES

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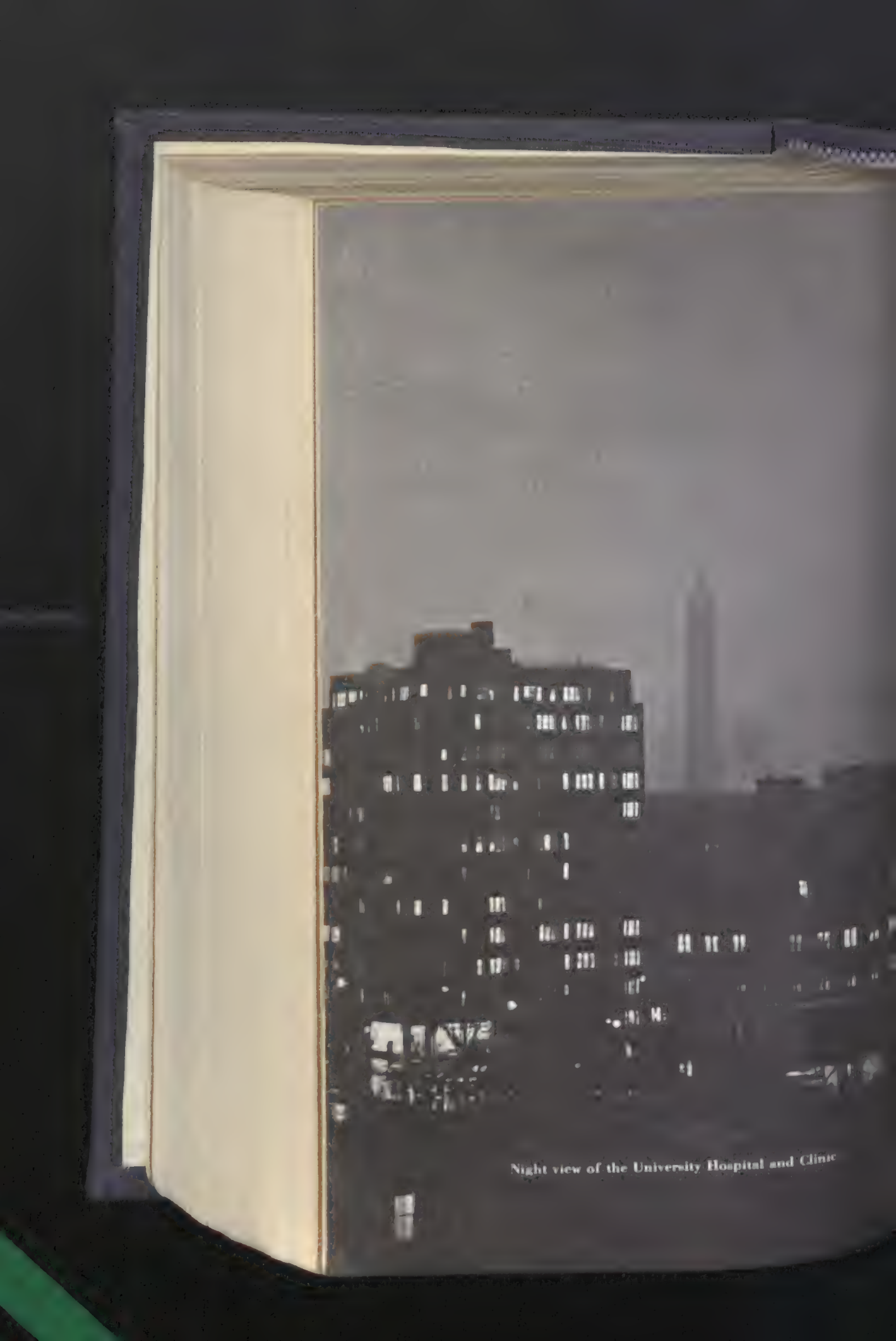
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Night view of the University Hospital and Clinic

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THE CALENDAR 1972–73*

1972

SEPTEMBER

S	M	T	W	T	F	S
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OCTOBER

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NOVEMBER

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1973

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JUNE

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JULY

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AUGUST

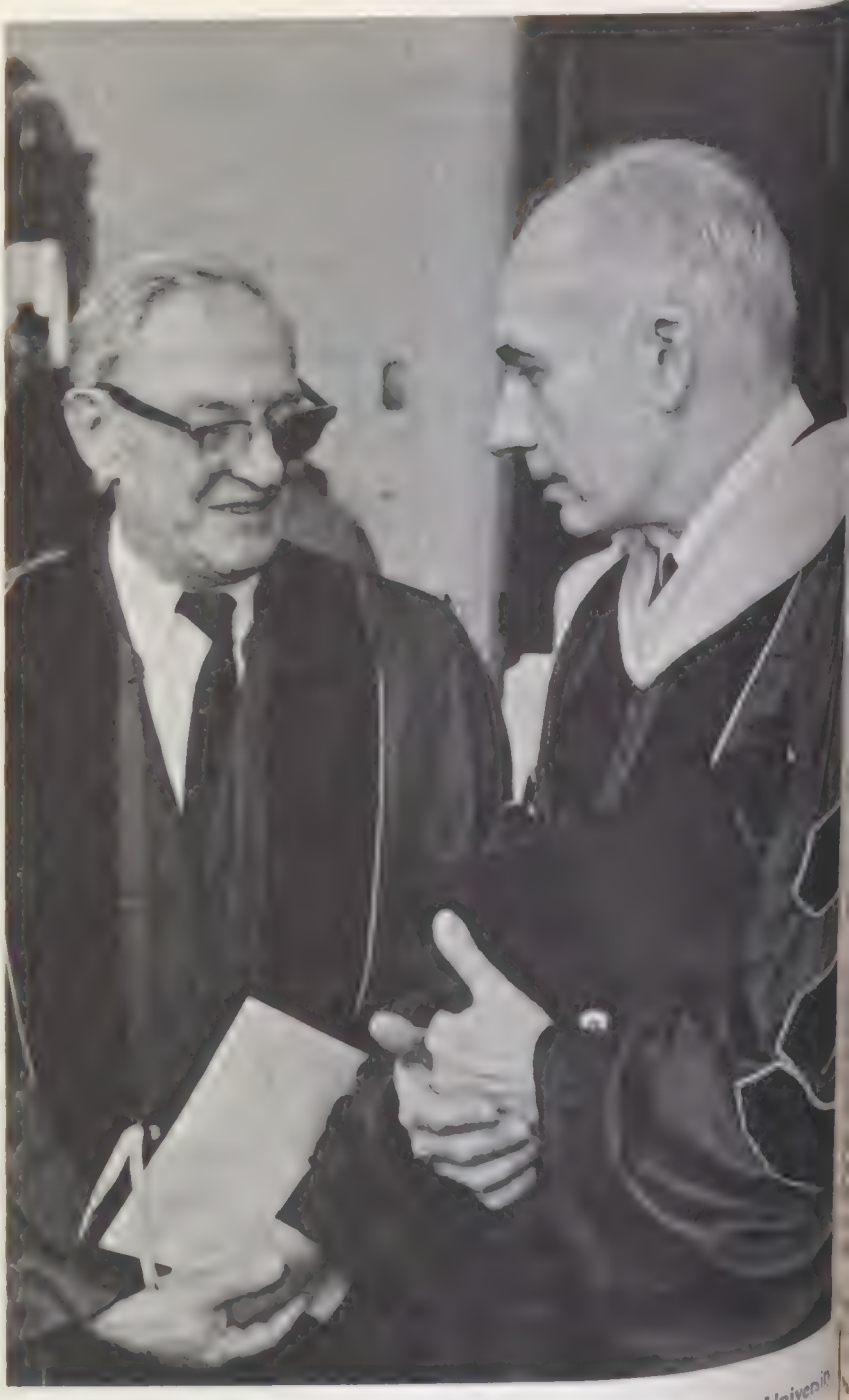
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1972–73 FALL SEMESTER

September 6	Registration *Wednesday*
September 7	Orientation for 1st-year students *Thursday*
September 8	Opening Assembly *Friday*
September 11	Classes begin *Monday*
November 22	Thanksgiving recess begins after last class *Wednesday*
November 27	Classes resume *Monday*
December 16	Christmas recess begins after last class *Saturday*
January 2	Classes resume *Tuesday*
January 15–19	Examination period *Monday–Friday*

* The examination schedule, recesses, and semester breaks do not apply to 3rd- and 4th-year students. See the *School of Medicine Schedule of Classes*.

1973	**SPRING SEMESTER**
January 16	Registration *Tuesday*
January 22	Spring-semester classes begin *Monday*
February 19	Winter Convocation (holiday) *Monday*
March 17	Spring recess begins after last class *Saturday*
March 26	Classes resume *Monday*
May 19	Last day of spring-semester classes *Saturday*
May 21–26	Examination period *Monday–Saturday*
May 27	Commencement *Sunday*



Nobel laureate and University alumnus Julius Axelrod (left) with Universit
President Elliott

THE UNIVERSITY

ORY AND ORGANIZATION

GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Colum- College in the District of Columbia. The name of the institution was ged in 1873 to Columbian University and in 1904 to The George Wash- on University. The debt of the University to George Washington, whose e it bears, is an intangible one.

orge Washington, as President and as private citizen, had urgently insisted the establishment of a National University in the Federal City. There he ed that, while being instructed in the arts and sciences, students from all of the country would acquire the habits of good citizenship, throwing off prejudices and gaining at first hand a knowledge of the practice, as well theory, of republican government. To further the materialization of his Washington left a bequest of fifty shares of The Potomac Company eeds the endowment of a University to be established within the limits of District of Columbia, under the auspices of the General Government, if Government should incline to extend a fostering hand towards it." The eas never extended "a fostering hand." The Potomac Company passed of existence, and Washington's bequest became worthless.

y conscious of Washington's hopes, but motivated primarily by a great inary urge and the need for a learned clergy, a group of dedicated min- and laymen sponsored a movement for the establishment of a college in District of Columbia. Inspired largely by the zeal and energy of the Rev- Luther Rice, they raised funds for the purchase of a site and petitioned ess for a charter. After much delay and amendment, Congress granted ter which was approved by President Monroe on February 9, 1821. To uard the College's nonsectarian character it provided "That persons of religious denomination shall be capable of being elected Trustees; nor any person, either as President, Professor, Tutor or pupil, be refused ance into said College, or denied any of the privileges, immunities, or nages thereof, for or on account of his sentiments in matters of religion." ring the entire time when the institution was known as Columbian Col- its activities were centered on College Hill, a tract of forty-six and a half between the present Fourteenth and Fifteenth Streets extending north Florida Avenue somewhat beyond Columbia Road. The Medical School ated downtown. For the better part of the Columbian University period,

the buildings of the University were situated along H Street between Thi
and Fifteenth Streets. The Medical School group still remains there.

During the last half century the University's present plant has been dev
in that section of the old First Ward familiarly known as "Foggy Bo
between Nineteenth and Twenty-fourth Streets, south of Pennsylvania A
Within a few squares are the White House, the Department of the Interi
State Department, the World Bank, and many other governmental offic
international agencies. The area is not without its reminders of historic i
to the University. President Monroe, who signed the Charter, lived a
Eye Street. The first President of the Board of Trustees, the Reverend O
B. Brown, was for fifty years the pastor of a church at Nineteenth an
Streets, and Washington selected Twenty-third and E Streets as the site
National University he had hoped to see established.

The University as it is now organized consists of Columbian College
and Sciences (undergraduate); the Graduate School of Arts and Scienc
professional schools, which include the National Law Center and the s
of Medicine, Engineering and Applied Science, Education, Governmen
Business Administration, and Public and International Affairs; the Coll
General Studies; the Division of University Students; and the Summer Se

The George Washington University is privately endowed and is goverr
a self-perpetuating Board of Trustees of which the president is an ex
member.

ACADEMIC STATUS

The George Washington University is accredited by its regional accr
agency, the Middle States Association of Colleges and Secondary Schools
University is on the approved list of the American Association of Uni
Women and is a member of the College Entrance Examination Board. Th
partment of Chemistry is on the approved list of the American Chemical So

The School of Medicine has had continuous approval by the Coun
Medical Education of the American Medical Association and the Assoc
of American Medical Colleges. The degree of the School of Medicine
ognized by all State Examining Boards.

CLOYD HECK MARVIN CENTER

The Center encompasses a building, an organization, and a program
building is the University's center for community life. It is the physical
ment for implementation of the programs and objectives of the organizati

The organization, composed of students, faculty, administrators, and
in the form of a three-board structure, provides an informal education
for individual and group activities adapted to the leisure-time interest
needs of the University community. It also provides training for those
involved in management and programming for the Center.

The primary purpose of the Center is the continuing development of a
cultural, intellectual, social, and recreational program. Its secondary pu
is the provision of its various services and facilities to the campus com
for the development of community life.

The Center houses a wide range of facilities to serve the needs of the
pus, including dining rooms and a rathskeller, a bookstore, lounges and

areas, bowling lanes and a billiard room, the Dorothy Betts Marvin Theatre, a University Club, student organization offices and workrooms, meeting and conference rooms, an information center, music listening rooms, social areas, shower and dressing rooms, lockers, and parking accommodations.

RECREATION

The Nation's capital provides abundant recreational resources, a large number of which are available at little or no cost. There are numerous art galleries, museums, concert halls, theaters, swimming pools, parks, and places of great historic interest. Social activities are provided by student organizations of the University, the School of Medicine, and University-sponsored programs such as intramural sports, concerts, recitals, and dramatic productions. Religious faiths are well represented in the Washington metropolitan area. Washington is one of the most colorful cultural and scientific centers of the world.

THE BOARD OF TRUSTEES 1971–72

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David Matthew Kennedy, LL.B., B.A., LL.D.
*Thaddeus A. Lindner, B.A. in Govt.
Franklin Jerome Lunding, LL.B., LL.D.

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* Nominated by the Alumni.

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Godfrey Leon Munter, B.A., LL.B., LL.D.
Donald W. Nyrop, B.A., LL.B.
*Beverly Ann Henry Oliphant, B.S., M.S., M.D.
Thornton W. Owen, B.S. in C.E., B.A.
Flaxie M. Pinkett, B.A.
Sidney Dillon Ripley II, Ph.D., L.H.D., Sc.D.
Orville Findley Rush, J.D., LL.D.
Carleton D. Smith
Charles E. Smith
Douglas Rathbone Smith, B.S.C.
Mark Sullivan, Jr., B.A.
*William Gregg White, B.S. in C.E.
John Johnston Wilson, LL.B.
Watson W. Wise, Ph.B.
Stephen Russell Woodzell, B.S. in E.E.
James Otis Wright, B.S., J.D.

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Newell Windom Ellison, B.A., LL.B., LL.D.
Charles Carroll Glover, Jr., M.A., LL.B., LL.D.
John Edgar Hoover, LL.M., LL.D., Sc.D., D.C.L.
Alfred Henry Lawson, LL.B., LL.D.
John Keown McKee
Benjamin Mosby McKelway, Litt.D.
Sidney William Souers, B.A., LL.D.
Lewis L. Strauss, Sc.D., LL.D., L.H.D.
Alexander Wetmore, Ph.D., Sc.D.
Lloyd Bennett Wilson

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Harold Frederick Bright, Ph.D., *Provost and Vice President for Acad*
Affairs
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Special Projects
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Student Affairs
Frederick Russell Houser, M.A., *Registrar*
Joseph Young Ruth, B.A., *Director of Admissions*

* Nominated by the Alumni.

THE SCHOOL OF MEDICINE

SCHOOL OF MEDICINE OF GEORGE WASHINGTON UNIVERSITY has a distin-
l history that goes back more than a century. In March, 1825, the School
ed with the intention of building "a medical school commensurate with
ogress and demands of a rising metropolis, and the improvement of serv-
oughout the country." The School of Medicine, the eleventh oldest in
untry, has met this responsibility by providing its students with a foun-
on in the medical sciences upon which they have built medical careers in
g, teaching, research, or administration.

1844, the School took on a new dimension when Congress granted it the
of the Washington Infirmary. Thus one of the earliest general teaching
als in the Nation was established in Washington.

the turn of the century the School was located at its present site—in the
of Washington—close to world-renowned library facilities, comprehen-
government medical museums, and numerous federal medical research and
ic establishments.

distinguished history of the George Washington University School of
ine closely parallels academic advances and medical progress of the Na-
The School has contributed to both.

George Washington University Medical Center, established in 1966,
s of the School of Medicine, the University Hospital, the University
the Warwick Building, and affiliated hospitals.

IVES

purpose of the School of Medicine is to prepare men and women in the
science of medicine to meet the health needs of a growing, ever-chang-
ety. It is the responsibility of the School to provide its students with a
atic plan of instruction in the basic medical sciences, with well-guided
experience, with opportunities for expression in research, and with a
ility in keeping with the highest ethics of the profession.

carry out its program, the School maintains a well qualified faculty and
use of facilities which provide exceptional opportunities for research
ical training in the Washington metropolitan area.


THE GEORGE WASHINGTON UNIVERSITY
SCHOOL OF MEDICINE
BASIC SCIENCES BUILDING
PAUL HEMELEVER LIBRARY

ENTRANCE REQUIREMENTS

For admission to the Doctor of Medicine degree program, a minimum of 90 semester hours must have been earned in an accredited institution of higher learning. Credits earned in a professional school can be applied to the fulfillment of this minimum requirement only if they are acceptable by the applicant's college or university toward a Bachelor's degree in Arts or Science. A credit under the quarter system is two-thirds of a semester hour.

It is advantageous to complete four full years of undergraduate work. Only exceptional students are accepted upon completion of the minimal requirements.

The following courses must be completed with satisfactory achievement before the applicant can be certified for matriculation. All required science courses must include sufficient laboratory work to give assurance of familiarity with the experimental methods and techniques of the disciplines.

1. **Biology:** 8 semester hours, including 4 hours of laboratory. This may be either in general biology or zoology but may *not* include separately credited courses in botany.
2. **Chemistry:** 8 semester hours of general inorganic chemistry (which may include qualitative analysis), including 4 semester hours of laboratory; and 6 to 8 semester hours of organic chemistry, including laboratory.
3. **Physics:** 8 semester hours, including at least 2 semester hours of laboratory.
4. **English:** 6 semester hours in composition and literature. This may be the usual introductory college course or its equivalent.

While not required for admission, courses in embryology, histology, genetics, and mathematics are strongly recommended.

ADMISSION PROCEDURE

All questions related to admissions, requests for applications, or the mailing of applications and credentials should be addressed to the Office of Admissions, School of Medicine, George Washington University, 1331 H Street, N.W., Washington, D.C. 20005.

The applicant should give careful attention to the entrance requirements, supplying all the information asked for on the application and furnishing the school with all the required credentials. An applicant cannot be considered until the following are received:

1. A fully completed *Application for Admission.*
2. Official transcripts of record from the registrar of *each* college, university, professional school, or other medical school attended—including summer sessions. Inclusion of transferred credits on a transcript will *not* serve in place of the transcript from the school where the credits were earned. Applicants currently in attendance should request official transcripts of record to date and send *supplemental transcripts* as soon as courses are completed and grades are recorded.
3. Letters of recommendation from the applicant's premedical advisory committee *or* from the references given in the application.
4. The results of the Medical College Admission Test, sponsored by the Association of American Medical Colleges. Information concerning this test may be obtained from premedical advisers or the Association of American

Medical Colleges, Division of Educational Measurement and Research, One Dupont Circle, N.W., Washington, D.C. 20036.

5. A check or money order made out to George Washington University in the amount of $25 to cover the cost of evaluating credentials.

ADVANCED STANDING

The School of Medicine's curriculum is such that admission with advanced standing is ordinarily limited to the third year. Applicants for admission to the second year will be considered in exceptional circumstances. The applicant for advanced standing must

1. Be or have been a regularly registered student in a school of medicine which is a member or an affiliate member of the Association of American Medical Colleges. Citizens of the United States in foreign medical schools other than those in Canada, should participate in the COTRANS program spon-sored by the Association of American Medical Colleges. Information on the program may be obtained from the Association at One Dupont Circle, N.W., Washington, D.C. 20036.

2. Be in good standing and eligible to continue in the school where he is currently enrolled, or eligible to re-enter that school if his education has been interrupted.

3. Have completed a course of study at least equivalent to that required for advancement to the year for which he is applying had he been a student in the George Washington University School of Medicine. For admission to the second year, he must have completed all work in anatomy, biochemistry, microbiology, and physiology. For admission to the third year, he must have completed didactic courses in medicine, surgery, obstetrics and gynecology, pediatrics, and psychiatry.

4. Have the endorsement of the dean of his school of medicine or his authorized delegate.

5. Take the Part I Examination of the National Board of Medical Examiners if he is applying for admission to the third year. He should plan to take the examination in June of the year in which he wishes to enter. Citizens of the United States attending foreign medical schools, other than those in Canada, are required to pass all subjects of the Part I Examination in order to demonstrate competence in the basic sciences. For admission to the second year, citizens of the United States attending foreign medical schools, other than those in Canada, must pass the National Board Examinations in anatomy, biochemistry, microbiology, and physiology.

The application procedures are otherwise the same as those given under the general instructions for admission.

SELECTION PROCEDURES

The Committee on Admissions reviews credentials as soon as they are complete. The Committee is guided in the selection of students by the applicant's academic ability, the results of the Medical College Admission Test, and personal qualifications as determined by letters of reference and personal interview. Applicants are interviewed regionally or locally on invitation by the Committee. The applicant who is invited to an interview should make

ort to keep the appointment or let the School know promptly if another angement must be made. The interviewer's report is an essential part of applicant's record. The Committee on Admissions will not make a final ommendation until it has been received.

Each applicant is notified of the Committee's decision as soon as possible. An applicant who is offered a place in a class is required, within two weeks, notify the Office of Admissions of the School of Medicine of his intent to ept the place reserved for him. A deposit of $100 must be remitted within weeks of the date of admission. This deposit will not be refunded after gistration. It will be credited toward the tuition for the first semester.

Accompanying the offer of a place in class will be forms for a report on sical condition. This report must be completed and returned to the Office Admissions of the School of Medicine by the student's physician within two ths of receipt of the letter of acceptance.

REGISTRATION

the fall semester of the academic year 1972–73, registration will be con- ed at the University Gymnasium, 2010 H Street, N.W., from 10 a.m. p.m., September 6. The time and place of registration for the spring ester, and the summer session of fourth-year clerkships, will be announced.

FEES AND FINANCIAL REGULATIONS

following fees have been established for the academic year 1972–73. (See s 16–17 for projected tuition increase for 1973–74.)

lication fee	$25.00
on fee, for the academic year:	
rst-year students	3,000.00
her students	2,600.00
ersity Center fee, charged all students (except those granted eave of absence" status) each semester	37.50
registration fee, for failure to register within the designated riod	15.00
payment fee, charged for failure to make payments when due e "Payment of Fees," below)	15.00
ncial reinstatement fee, for reinstatement after financial encum- nce for nonpayment of fees (see "Payment of Fees," below)	35.00
nuous Registration fee, charged each student granted "leave of ence" status for each semester in the School of Medicine	80.00
ersity Center fee, charged each student granted "leave of ab- ce" status, each semester	3.50
ation fee	25.00
ned check fee, charged a student whose check is improperly fted, incomplete, or returned by the bank for insufficient funds	15.00

ENT OF FEES

nnual fee of $3,000 for the 1972–73 academic year for first-year stu- is payable at the rate of $1,500 on or before registration day for each er. The annual fee of $2,600 for the 1972–73 academic year for all

other students is payable at the rate of $1,300 on or before registration day each semester. Students registered for the summer session of fourth-year clerkships will be on "continuous registration" without charge until the following fall semester. No student is permitted to complete registration or attend classes until all charges are paid. Tuition and fees are payable at the Office of the Cashier of the University. Checks and postal money orders should be made payable to George Washington University.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. When tuition is due and payable in full as described above, a student may sign a deferred payment contract with the Student Accounts Office at the time of registration permitting him to pay one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half on or before November 1, 1972 (for the fall semester), and March 1, 1973 (for the spring semester). Interest at the rate of eight per cent per annum on the unpaid balance will be charged from the date of registration to the date payment is made. The University will not obligate itself to notify the student, in advance, of the payment-due date for the second half of the semester charge.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to sign deferred payment contracts unless the total tuition and fee charges exceed the value of the tuition awards by $500 or more. Under such circumstances the student may be permitted to pay one-half of the amount due from the student at the time of registration and to defer the balance by signing a deferred payment contract.

Students who fail to make any payment when due will be automatically charged a $15 late payment fee. Accounts which become 30 days past due will be financially encumbered and will be subject to the interest charge of eight per cent per annum. In the event a student's account is financially encumbered, the student forfeits his rights to the use of the deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $35.

After a student has entered the course of instruction he is obligated for tuition for the full semester. A student registered for the clerkships of the summer session is obligated for tuition due at the time of registration for the following fall semester, except that in the case of withdrawal or leave of absence a *pro rata* payment will become due immediately.

Acceptance by the University of a student's fees does not in any way obligate the School of Medicine to accept the student for any subsequent semester or summer session, and the right is reserved to require the withdrawal of any student whenever, in the interest of the student or the School, the Faculty deems it advisable to do so.

PROJECTED TUITION INCREASE FOR 1973–74

No tuition increase has been projected for first-year students for the academic year 1973–74. An increase of $400 has been projected for all other students

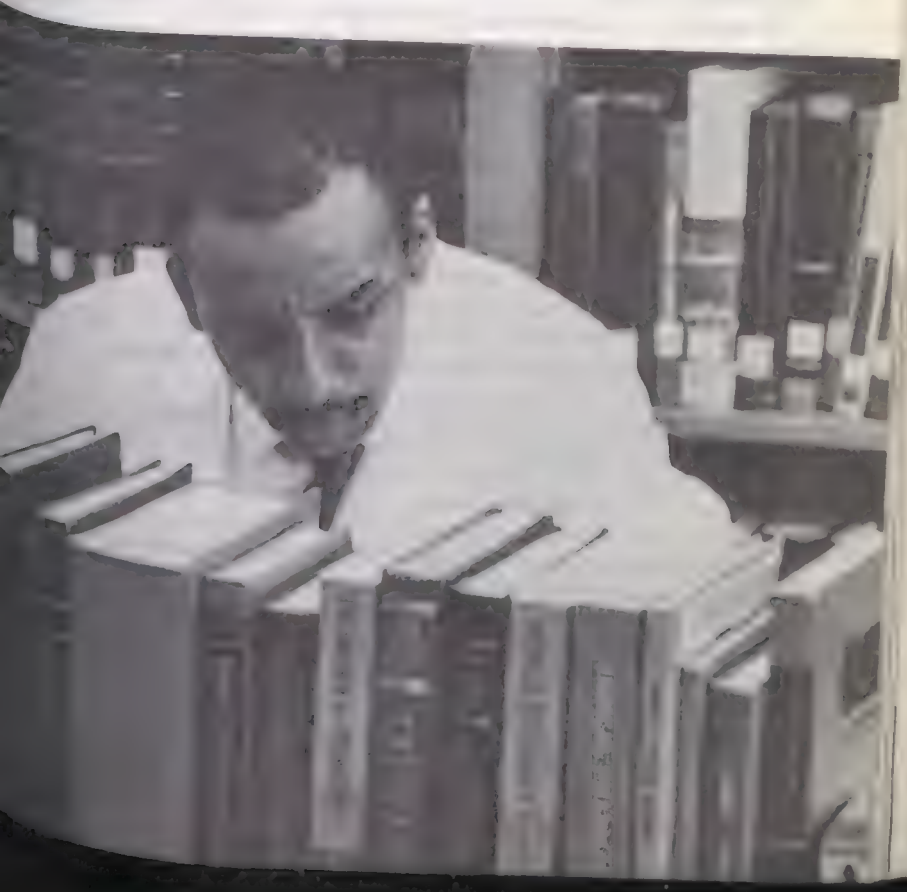
udents for 1973–74. Every effort will be made to keep tuition increase with- these limits. However, it is not possible to project future economic data th certainty, and circumstances may require an adjustment in this estimate.

ST OF TEXTBOOKS AND STUDENT EQUIPMENT

e minimum cost of necessary textbooks and student equipment (microscope, wing materials, glass slides, clinical thermometer, stethoscope, hemocytom- , uniforms, etc.) is approximately as follows: first year, $700; second year, 0; third year, $200; and fourth year, $150. Microscopes must be provided the student. Rentals are not available.

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ause many parents may wish some option in meeting and financing all part of the cost of a college education, the University offers educational loan ns through the Girard Bank, Philadelphia, Pa.; Funds for Education, Inc., nchester, N.H.; and The Riggs National Bank, Washington, D.C.
lthough similar in purpose, these plans vary somewhat in coverage and ditions. One-year and multiple-year plans are available. Insurance cover- the life and health of the sponsor is provided through these plans.
brochures and applications describing these plans are available in the Office tudent Financial Aid, George Washington University, Washington, D.C. 6.



DEGREES

DOCTOR OF MEDICINE

Every candidate for graduation with the degree of Doctor of Medicine must have satisfactorily completed the requirements of the School of Medicine as described under "Plan of Instruction" on pages 38–40, including no less than four academic years of study as a matriculated student in Medicine. He must have completed all required courses and passed satisfactorily all prescribed examinations.

HONORS

A candidate who has completed the four-year medical course and has received the grade of *H* (Honors) in courses totalling 50 per cent or more of the total number of semester hours he has taken may be recommended by the Faculty for graduation "With Distinction."

COMBINED BACHELOR OF ARTS AND DOCTOR OF MEDICINE

In cooperation with Columbian College of Arts and Sciences, a seven-year curriculum leading to the combined degrees of Bachelor of Arts and Doctor of Medicine is offered.

In order to be recommended for the degree of Bachelor of Arts, the candidate must complete at least 94 semester hours of prescribed college work (at least 30 hours and one year of residence must be completed in Columbian College of Arts and Sciences) and the first year of the medical curriculum. Upon satisfactory completion of the fourth year of the medical curriculum the student becomes eligible for the degree of Doctor of Medicine.

COMBINED MASTER OF SCIENCE AND DOCTOR OF MEDICINE

The departments of the School of Medicine cooperate with the Graduate School of Arts and Sciences in offering programs leading to the combined degrees of Master of Science and Doctor of Medicine in the fields of anatomy, biochemistry, genetics, microbiology, mycology, pathology, pharmacology, and physiology.

Students in the School of Medicine who wish to apply for the combined degrees of Master of Science and Doctor of Medicine must meet the requirements for admission to the Graduate School of Arts and Sciences. They must be recommended by the chairman of the department and by the deans of the Graduate School of Arts and Sciences and the Medical Center.

The Master of Science program consists of a minimum of 30 semester hours of credit. A maximum of 12 semester hours of credit for graduate-level courses *completed as a part of the Doctor of Medicine degree* (and not already applied toward the Bachelor's degree) will be allowed in fulfillment of the requirements of the Master of Science degree. The remaining 18 semester hours of course work, which includes a thesis, must be in course work in the basic medical sciences normally required for a Master of Science degree in the Graduate School of Arts and Sciences.

AL PROGRAM FOR THE DOCTOR OF MEDICINE AND CTOR OF PHILOSOPHY DEGREES

cooperation with the Graduate School of Arts and Sciences a dual program available to qualified students who seek both the Doctor of Medicine and ctor of Philosophy degrees. The requirements which must be fulfilled for th degrees are identical to those currently and separately established in School of Medicine and the Graduate School of Arts and Sciences.

In order to enter the dual degree program, a prospective student first must ply for and gain admission to both the Graduate School of Arts and Sciences d the School of Medicine separately through established procedures. Upon mission to both schools, he may then apply for affiliation with the dual gree program. Work toward the Doctor of Philosophy degree is performed der the jurisdiction of a *departmental* Doctoral Committee and is available more than fifty fields.

A student working toward these degrees may apply a maximum of 24 se-ter hours of approved work taken in the School of Medicine toward the l of 72 semester hours required to complete the requirements for the Doc- of Philosophy degree. Twenty-four hours of this requirement must be ed in graduate courses during periods when the student is not obligated to time enrollment in the School of Medicine, i.e., during summer sessions, ation periods, etc. The final 24 semester hours of dissertation research to- d the Doctor of Philosophy degree may begin concurrently with the final ester of graduate course work. The estimated expected time for completion his dual program is 6 years.

STER OF SCIENCE AND DOCTOR OF PHILOSOPHY REQUIREMENTS

detailed requirements for the degrees of Master of Science and Doctor Philosophy are stated in the *Undergraduate and Graduate Catalogue* of the versity, which is available at the Graduate School of Arts and Sciences, rge Washington University, Washington, D.C. 20006.

FINANCIAL AID

following fellowships, scholarships, and loan funds are available to stu- in the School of Medicine. Unless otherwise specified, inquiries should irected to the Office of the Dean of the Medical Center, George Washing- University, 1331 H Street, N.W., Washington, D.C. 20005.

OWSHIPS

ilbur J. and Edith K. Carr Memorial Fellowship Fund (1965).—By bequest dith K. Carr, former Trustee of the University. The income from this fund des fellowships in surgery, medicine, or medical research at the George ington University Hospital.

muel Jordan Graham Fellowship in Surgery (1961).—By bequest, in ory of Judge and Mrs. Graham. The income from this fund, up to 0, may be used to assist students who are pursuing postgraduate study or rch, preferably in surgery, at the School of Medicine.

If no individual is conducting such work or deserving of the award, income may be used to provide one or more scholarships (to cover tuition other school expenses deemed appropriate) for students in the School of M icine. Application should be filed with the Chairman of the Departmen Surgery no later than March 1.

Robin Miller Research Fellowship (1953).—A $3,000 fellowship estab by bequest of Mrs. Robin Miller for the study of cardiovascular diseases

Henry Rau Foundation Student Fellowship Grant (1967).—Awarded nually to a student in the School of Medicine for research in cancer and diseases at the George Washington University Clinic.

U.S. Public Health Service Training Grants.—Information concerning ing grants in fields of the medical sciences is available at the Office of the of the Medical Center.

SCHOLARSHIPS

Scholarships awarded to students in the School of Medicine are credited fo academic year unless otherwise specified. Each holder must carry a full ule of academic work during the period for which the scholarship is aw Applicants should apply on prescribed forms which must be filed in the of the Dean of the Medical Center no later than March 15 preceding academic year for which the scholarship is to be awarded.

Achievement Rewards for College Scientists (ARCS) Foundation Scholarship.—Awarded to a student on the basis of financial need and s grades. Candidates must be citizens of the United States.

Anna Bartsch Hospital Intern Scholarship (1946).—A partial scho established by Dr. Anna Bartsch-Dunne as a memorial to her mother. A to a woman intern in the University Hospital.

Anna Bartsch Medical Student Scholarship (1946).—A partial scho established by Dr. Anna Bartsch-Dunne as a memorial to her mother. A to a woman in the School of Medicine "of outstanding scholarship, cha and promise, who intends to make the practice of medicine her life profes

Jack I. Bender Scholarship (1967).—A partial scholarship established family of Jack I. Bender as a memorial to their father. Awarded annua student in the School of Medicine on the basis of academic performance need.

Everett Lamont Bradley Scholarship (1954).—A partial scholarship, quest of Alice R. H. Bradley in memory of her son, for a student in the of Medicine.

Dr. Edith SeVille Coale Scholarships (1965).—Provided at the request Coale for women in the School of Medicine. The scholarships are admin by the Zonta Club of Washington. Application should be made to the of the Dean of the Medical Center no later than December 1.

Joseph Collins Foundation Scholarships (1951).—Available to students upon application through the Office of the Dean of the Center.

George Washington University Medical Alumni Scholarships (196 $2,000 scholarship awarded to a student in each of the four classes School of Medicine, on the basis of financial need and scholarship.

Health Professions Scholarship Program (1966).—Awarded by the Medicine to students who qualify under the provisions of Public Law

uiries should be directed to the Associate Dean for Student and Curricular airs.

hon Luria Hines Scholarship (1968).—Established by friends, students, and ulty of the School of Medicine as a memorial to the wife of a medical dent.

Robert Wood Johnson Scholarship Fund.—Available to medical students m New Jersey.

ll-Wives of Washington Scholarship Fund (1958).—Two tuition scholar- s available to students in the School of Medicine.

dney A. Levine Scholarship Fund (1971).—Established to assist medical dents on the basis of need and academic performance.

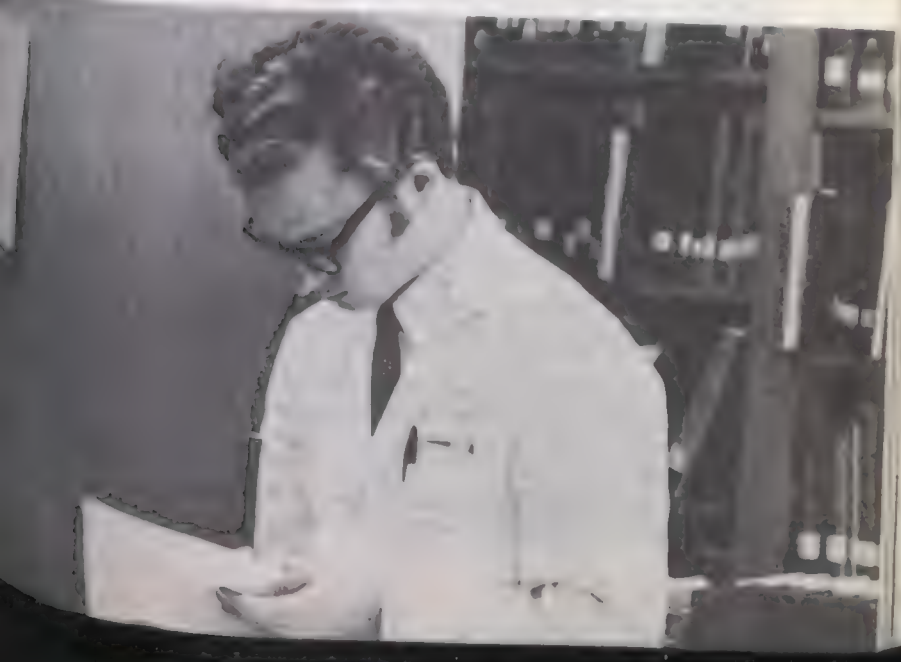
Medical Research Scholarships and Traineeships.—For student participation he research programs of the School of Medicine or special training in re- ch methods. Research scholarships are ordinarily awarded for full-time rity during the summer months; research traineeships support part-time during the academic year. Scholars are "matched" with members of the ty in accordance with their mutual interests. Trainees are designated by departments responsible for the programs. These programs have been spon- by the National Institutes of Health. In addition a number of research arships have been made available through the Washington Heart Associa-

ar. Pfizer Medical Scholarship Program (1962).—Established to financially a student in the School of Medicine.

hool of Medicine Scholarship Fund (1948).—Established by gifts of vari- onors for tuition awards in the School of Medicine.

vid Perry Steinman Memorial Scholarship Fund (1960).—Established by ds and classmates. Awarded annually to a sophomore in the School of cine on the basis of need and academic performance.

mes J. Whisman Scholarship (1966).—A partial scholarship by bequest of s J. Whisman for needy and deserving students in the School of Medicine.



COLUMBIAN WOMEN SCHOLARSHIP FUNDS

The Columbian Women Scholarships are awarded to women students on basis of financial need and scholastic attainment. Candidates must have pleted a minimum of 15 hours at this University with a minimum *B* average, or the equivalent. A letter of application for these scholar should be addressed to the Chairman, Columbian Women Scholarships, of the Alumni Office, George Washington University, Washington, 20006, no later than May 15 for the fall semester, and January 1 for spring semester. Scholarship aid is awarded from income of the follo endowments:

Jessie Fant Evans Scholarship Fund (1967).—A $10,135 fund for tuition established by bequest of Jessie Fant Evans, former Trustee of the Univers

Lewes D. and Myrtie H. Wilson Memorial Scholarship Fund (1926). fund of $1,000 for tuition aid, established by Elizabeth Wilson as a memo to her parents.

LOAN FUNDS

American Medical Association Medical Education Loan Guarantee Prog (1960).—Available to medical school students (beyond the first semester medicine).

Edith K. Carr Medical School Loan Fund (1962).—Established by Carr for loans to students in the School of Medicine.

Health Professions Student Loan Program.—This fund is available to a time student pursuing a course of study leading to the degree of Doc Medicine. Interns, residents, students engaged in premedical or other p sional training, and students enrolled in programs of study other than leading to the degree mentioned above are *not* eligible for these loans.

A candidate must (1) be a citizen of the United States or have such gration status and personal plans as to indicate that he intends to become manent resident of the United States, (2) be in need of the amount of the to be able to pursue his course of study, and (3) be in good standing with School. Inquiries concerning deadlines and applications should be directed the Associate Dean for Student and Curricular Affairs.

Joseph H. Himes Loan Fund (1956).—Available for loans to students School of Medicine.

W. K. Kellogg Medical School Loan Fund (1942).—Established by Kellogg Foundation in Battle Creek, Michigan.

Jessie B. Martin Loan Fund (1967).—Established by friends of Mrs. Jes Martin, former Editor of Academic Publications at the University. An gency fund for loans up to $250, payable prior to ceasing of enro with interest rate of 3 per cent per annum. Application should be m the Director or Assistant Director of the Office of Student Financial Aid.

Pfizer Medical School Loan Fund (1953).—Established by Chas. Pfi Co., Inc.

School of Medicine Loan Fund (1951).—A fund established by school students and augmented by bequest from the estate of Ethel L. M

Sutherland Medical School Loan Fund (1941).—Established by Sutherland.

W. E. Wrather Medical Student Loan Fund (1967).—Established by Mrs. Alice D. Wrather in memory of her husband.

PRIZES

merican Medical Women's Association, Inc., Prize.—A certificate awarded ally to each woman ranking academically in the upper 10 per cent of the uation class. An additional prize of $100 is awarded to a woman who has ighest scholastic ranking in her graduating class.

nuel M. and Miriam S. Dodek Prize (1967).—Established in memory of ssor Bernhard Zondek, the eminent discoverer of the endocrinology of uman female reproductive cycle. Awarded annually to a member of the uating class of the School of Medicine who has attained a commendable iedge and understanding of the field of female endocrinology.

ie S. Freed Prize (1957).—Awarded annually to a member of the graduclass in the School of Medicine who has demonstrated exceptional proey in the field of preventive medicine.

ther Freeman Prize (1966).—Awarded annually to a student in the gradg class in the School of Medicine who submits the best essay based on al investigation.

c Horwitz Prize (1959).—A prize of $100 awarded annually to a senior has demonstrated exceptional proficiency in the field of surgery.

ar Benwood Hunter Prize (1952).—Established by The George Washingniversity Medical Society, now known as The George Washington Uni- Medical Alumni Association. Awarded annually to a member of the uating class of the School of Medicine who has demonstrated outstanding in pathology.

obi Medical Society Prize (1962).—Established in memory of Dr. Abrajacobi, the founder of pediatrics practice in the United States. Awarded lly to a member of the graduating class of the School of Medicine who monstrated outstanding ability in pediatrics.

ward Kane-A.F.A. King Obstetrical Society Prize (1937).—Established mory of Dr. Howard Kane and Dr. A.F.A. King, who served as sors in the School of Medicine. Awarded annually to a member of the ating class of the School of Medicine who has demonstrated outstanding in obstetrics and gynecology.

ge Medical Publications Prize.—Awarded annually to two members of aduating class who are considered outstanding by their classmates. The consists of the graduate's choice of four books published by Lange Medilications.

on W. Lawson Prize (1957).—A prize of $100 established by Mrs. n in memory of her husband, who was a distinguished member of the al Staff of the University, presented annually to a member of the graduclass who has demonstrated exceptional proficiency in the field of obstetd gynecology.

amin Manchester Prize (1966).—Established by a grateful patient in of Doctor Benjamin Manchester, Clinical Professor of Medicine. Awardually to a member of the graduating class in the School of Medicine who outstanding record and shows promise of real humanitarianism in the of medicine.

Mosby Book Prize.—Awarded annually to four members of the gradclass who are considered outstanding by their classmates. The prize conthe graduate's choice of a book published by C.V. Mosby Company.

Julius S. Neviaser Prize in Orthopaedic Surgery (1956).—A prize of $ awarded annually to the senior in the School of Medicine who scores the hi est grade in a written examination and clinical aspects of orthopaedic surg

John Ordronaux Prize (1907).—By bequest, $150 awarded annually to member of the graduating class of the School of Medicine who has the est scholastic standing.

Roche Prize.—An Omega watch and a scroll awarded annually to the mem ber of the graduating class who best exemplifies the ideals of the medi American physician. The winner is chosen by vote of the graduating class

William G. Schafhirt Prize (1966).—By bequest, $200 awarded annually the senior student in the School of Medicine for the best original essay or ar on some medical subject of current public interest.

Upjohn Achievement Prize.—A prize of $200 and an inscribed plaq awarded annually to a member of the graduating class selected by his cl classmates on the basis of outstanding scholastic and personal achievement

REGULATIONS

ATTENDANCE

A student is not permitted to attend classes until registration has been c pleted and fees due have been paid. Regular attendance is required.

GRADES

H—Honors; *P*—Pass; *F*—Failure; *I*—Incomplete; *W*—Withdraw.

Those students whose performances in a subject, as determined by the partment concerned, are of a very high caliber, and who, in addition, h demonstrated those qualities of intellectual curiosity, integrity, and self- pline which clearly set them apart from the majority of the group, may assigned the grade of *H* (Honors).

The grade of *P* (Pass) will be assigned to all students who meet the mum standards of performance in a subject as determined by the depa concerned, unless they are entitled to the grade of *H* (Honors).

The grade of *F* (Failure) will be assigned when a student fails to meet minimum standards of performance in a subject as determined by the ment concerned. A student receiving the grade of *F* in any subject may advance to the work of the following year until he has complied with recommendations of the Committee on Scholarship as are approved by Executive Faculty.

The grade of *I* (Incomplete) will be assigned when a student fails to plete all the required work in a course for reasons acceptable to the Asso Dean for Student and Curricular Affairs. A student in the first and years may not proceed into the work of the following year until a of *I* has been removed; if not removed, a grade of *I* will be automa changed to a grade of *F* (Failure) after one year. A student in the third fourth years must remove a grade of *I* prior to graduation.

The grade of *W* (Withdraw) will be assigned only when a student is to continue in school for reasons acceptable to the Associate Dean for and Curricular Affairs (such reasons may *not* include poor scholarship).

udent may be readmitted, at the discretion of the Associate Dean for Stu- and Curricular Affairs, within a period of two years, and he may repeat redit the course or courses in which he had been assigned the grade of *W*.

ATION

udent who receives grades of *F* in courses totalling 6 or more semester s in one semester will be placed on academic probation for the following ester. A student who while on probation receives a grade of *F* in any e will be continued on probation for the following semester.

EMIC DISMISSAL

dent (1) who exceeds three semesters, consecutive or otherwise, on pro- n; or (2) who receives grades of *F* in courses totalling 14 or more semes- ours in any academic year; or (3) who receives grades of *F* in courses ng more than 20 semester hours of work in the School of Medicine; or whose academic achievement is otherwise considered unsatisfactory by the mittee on Scholarship will not be allowed to continue in the School of ine.

INATIONS

inations, which may be written, oral, or practical, will be held during or at the end of each semester.

students in the School of Medicine are required to take Part I and Part the National Board of Medical Examiners. A student failing to attain a g average for the Part I examination in June must repeat the examina- n September of the same year and will be registered on academic proba- or the following semester.

EMIC DISHONESTY

mic dishonesty on the part of any student will result in a disciplinary of *F* for the course involved and also may, upon the recommendation of ean's Council, result in his suspension from the University for a stated , at the end of which time he may petition for readmission. Upon val of the Dean's Council, the disciplinary grade of "Failure—Academic nesty" will be recorded for the course involved. A student so suspended be withdrawn from all other courses except those in which all work een completed.

ATION

plication for Graduation.—Application for graduation must be filed in the of the Dean and the fee must be paid at the time of registration for the mester of the senior year.

sence at Graduation.—A candidate is required to be present at the gradua- xercises unless written application for graduation *in absentia* is approved Dean.



RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any studen
the University, or from any class or classes, whenever, in the interest
student or the University, the University Administration deems it ad

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve th
to modify or change requirements, rules, and fees. Such regulations
into force whenever the proper authorities may determine.

RIGHT TO MAKE CHANGES IN PROGRAMS

The right is reserved by the University to make changes in programs
notice whenever circumstances warrant such changes.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 169–70) contains regulations recently approved
University's Board of Trustees.

UNIVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATION

In general, the policy of the University is one of attempting to keep
dent's record confidential and out of the hands of those who would
other than legitimate reasons. At the same time, the policy must be
enough not to hinder the student, the University, or the community
legitimate endeavors.

o information concerning a student will be released except as noted below:
Information such as whether or not the student is currently enrolled;
s of attendance; verification of date and place of birth; degrees earned,
y, date, major field or area of concentration, and honors received; home
local addresses and telephone numbers; school, college, or division of en-
ent, and class; verification of signature; name and address of parent or
dian.

The issuance of formal transcripts of record to recognized institutions of
r learning; the certification of academic achievement to the various recog-
professional associations (law, medicine, engineering, education, etc.).
ditional information will be released only on written authorization from
tudent, or by court order or subpoena. If a subpoena is served, the stu-
whose record is being subpoenaed will be notified and the subpoena will
ferred to the University's legal counsel.

overnment investigative agencies have no inherent right to access to student
and records. If expressly requested, properly identified representatives
federal, state, or local government agencies may be given the information
under No. 1 above.

STUDENT HEALTH SERVICE

Student Health Service is an outpatient clinic designed to assist all regis-
students with their health needs while attending the University. This
e, located at 935 22nd Street, N.W. (in the H.B. Burns Memorial
ng), assists with health conditions and medical emergencies by advice
treatment, proper referral when necessary, and cooperation with other
cians and medical facilities.

ring the academic year, the hours are 9 a.m. to 10 p.m., Monday through
. and 9 a.m. to 12 noon on Saturday. The weekday hours during the
er sessions are from 9 a.m. to 9 p.m.; Saturday hours are 9 a.m. to 12
A physician is in attendance during these hours.

serious illnesses or emergencies that occur when the Student Health
e is closed, students may call the Medical Bureau (223-2200), or go to
mergency Room of the University Hospital for treatment. Charges for
these services are solely the responsibility of the student.

rges for services that are not available through the Student Health Serv-
ch as X-ray and laboratory tests, specialty services, and consultations,
st be paid by the student.

Student Health Service is available only to those students who are cur-
enrolled in the University. A student who is not currently enrolled, or
ho has severed his connection with the University, is ineligible for this
. This service is not available between the last day of examinations for
ster or summer session and the completion of registration for the next
er or summer session.

tudent intending to train for an athletic team is required to pass a medi-
amination. The University is not responsible for injuries received in
ll-state or intramural games, or in any of the activities of the Depart-
Physical Education.

HEALTH AND ACCIDENT INSURANCE

In addition to its clinical service, the Student Health Service Office has arranged for Health and Accident Insurance, on an elective basis, for *full-time* students. Arrangements for insurance coverage are the responsibility of the student. The University assists in the subscription process by administering application cards and collecting fees during official registration periods.

A student may subscribe and pay for the coverage *only* when he pays his tuition and other fees at registration. For those few students who register when the subscription will be available during official late registration. *Subscriptions during late registration will not be available for those students who previously registered and failed to subscribe at that time.* Students who participate in the Summer Advanced Registration Program must subscribe and pay for the coverage on the appropriate date of the Summer Advanced Registration. Students who participate in the pre-registration, conducted in April for the following Fall Semester, must subscribe for the coverage at the time of pre-registration in April. The fee will be included with the tuition bill and must be paid by August 1.

The fee charged provides coverage on a 6-month basis—September through February for those subscribing for the fall, and March through August for those subscribing for the spring. The coverage is effective, with minor variations (see available folder), whether the student is at the University, at home or elsewhere. The fee charged at each official registration period will be the payment required for full coverage for a 6-month period and must be paid in full at the time of subscription.

The policy contract is between the individual student and the insurance carrier and is accepted at any hospital or emergency room that accepts this type of medical coverage. Details of the policy are contained in a folder available at the Student Health Service Office.

PHYSICAL EXAMINATIONS

All first-year students are required to have a comprehensive physical examination prior to admission to the School of Medicine. The students are informed of significant findings and advised regarding such measures as will tend to help them maintain a high standard of health.

In addition medical students benefit from the complete Tuberculosis Case Finding Program which the School maintains. Under this program all students receive tuberculin tests, X-ray examinations, and such special attention by chest specialists as is necessary to reduce to a minimum the danger of tuberculosis. Students are immunized against those diseases for which prophylaxis exists.

RESIDENCE HALLS

Complete information concerning the University's residence halls is available from the Director of Housing, George Washington University, Washington, D.C. 20006.

Information concerning off-campus housing may be obtained at the office of the Dean of the Medical Center. Reservations for private housing must be made by students.

HONOR SOCIETIES

lpha Omega Alpha.—National Honor Medical Society. Members of the ior and Senior classes meeting the qualifications specified by the constitution he Society are eligible for election to membership.

'illiam Beaumont Medical Society.—Medical students showing unusual abil- lor medical writing and research are elected by the active members of this ety.

loward Kane-A.F.A. King Obstetrical Society.—The fifteen students in the d- and fourth-year classes who maintain the highest grades in their work in etrics are eligible for membership.

mith-Reed-Russell Society.—Students of the third and fourth years who e received the grade of *H* (Honors) in courses totalling 40 per cent or e of their total semester hours are eligible for membership.

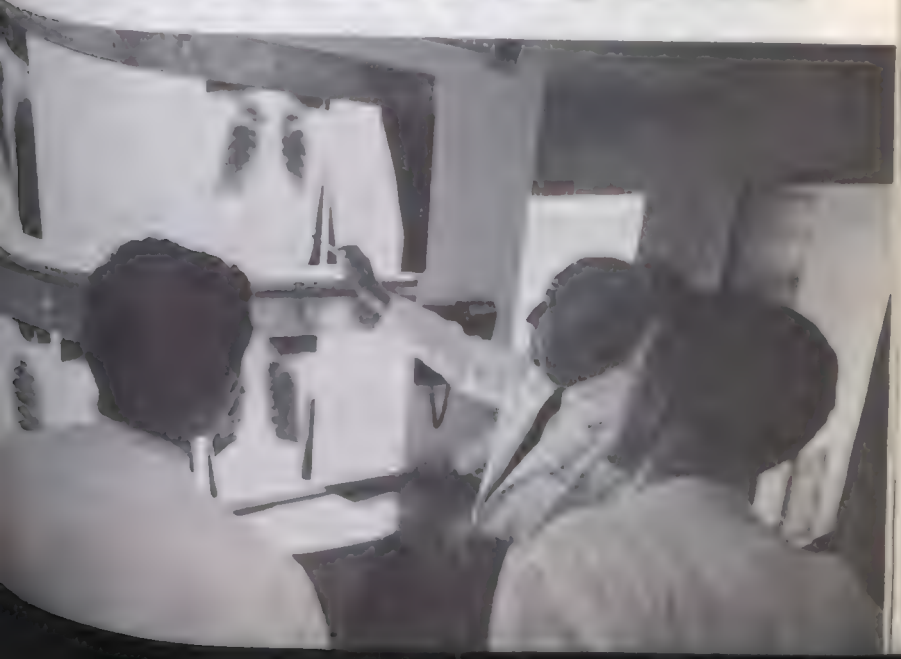
EQUIPMENT AND BASIC SCIENCE FACILITIES

ilities for the School of Medicine are located at 1331, 1335, 1337, and 1339 treet, N.W., in downtown Washington.

dministrative Offices.—The administrative offices of the School, 1331 H et, consist of the offices of the Dean of the Medical Center, Medical Ad- tions, Research Administration, and the Medical Alumni Association.

Medical School Buildings.—In the buildings housing the School of Medicine, 5 and 1337 H Street, there are lecture rooms, classrooms, students' rooms, the following laboratories: anatomy, biochemistry, microbiology, path- gy, pharmacology, and physiology. The laboratories are fully equipped to ble students to pursue adequately the laboratory courses and to acquire the nical skill necessary in modern clinical and investigative work.

Research Building.—The Research Building, 1339 H Street, houses special oratories for graduate and staff research in the departments of Anatomy, hemistry, Microbiology, Pharmacology, and Physiology. Special facilities



are provided for the study of radioactive compounds, for tissue-culture techniques, and for virologic procedures. Qualified students are invited to participate in certain aspects of the research program either on a volunteer basis or with the support of special Research Scholarships.

Teaching Aids.—This administrative unit of the School of Medicine directs the activities of the following service functions: Medical Illustration and Photography, Audio-visual Facilities (including television), and Xerox Duplication.

Medical Library.—The Medical Library, in well-equipped quarters on the first floor of 1339 H Street, N.W., contains 45,140 carefully selected volumes including the new medical works and the principal medical journals.

Interlibrary loan service is maintained with other medical and scientific libraries.

The Medical Library is open from 7:30 a.m. to 10 p.m. each class day, Monday through Friday; from 8:30 a.m. to 5 p.m. Saturday; and from 12 noon to 5 p.m. Sunday.

A branch of the Medical Library is maintained in the University Hospital for the use of the resident physicians, interns, and students. It is open every day from 8:30 a.m. to 11 p.m.

CLINICAL FACILITIES

Students at the George Washington University School of Medicine receive clinical experience at the University Hospital, the University Clinic, the Warwick Building, and affiliated hospitals.

THE GEORGE WASHINGTON UNIVERSITY HOSPITAL AND CLINIC

The George Washington University Hospital.—This 550-bed hospital, staffed and directed by the Faculty of the School of Medicine, serves as an active teaching facility for students in the School of Medicine and for a large House Staff. It is fully approved by the American Medical Association, the American Hospital Association, the American College of Physicians, and the American College of Surgeons, through the Joint Commission for the Accreditation of Hospitals. The University Hospital is on Pennsylvania Avenue at Washington Circle, six blocks from the White House, near the downtown area of metropolitan Washington. Annual admissions of inpatients number approximately 20,650. During 1970, approximately 40,000 persons were treated and examined in the Emergency Room.

The Eugene Meyer Pavilion is a new and attractive six-floor addition to the University Hospital that is fully functional. In addition to one hundred new beds, the Eugene Meyer Pavilion contains an expanded operating suite specially serviced by modern electronic monitoring devices; an In- and Out-surgical Service which has its own reception accommodations, special operating rooms and recovery area; an entire floor set aside for clinical research activities including a series of superbly equipped special laboratories and eighteen specially designated patient beds; a six-million volt linear accelerator to facilitate radiation therapy; a well-equipped and very active radioisotope laboratory devoted to a wide variety of diagnostic and therapeutic procedures; specially designed teaching and conference areas which have telephonic-dictating, tape-recording and visual-projection devices available.

The University Clinic.—The University Clinic is housed in the 13-story
B. Burns Memorial Building adjacent to the University Hospital. Clinic
cilities for each Hospital Service and cancer detection are available. Students
e assigned for instruction in the University Clinic. Visits of ambulatory
atients to the Clinic are approximately 90,000 a year.

The Helen L. and Mary L. Warwick Memorial Building.—This building
ouses the multitest health screening facility, the surgical primate laboratories,
nd cancer research. The Department of Clinical Engineering operates the
ltramodern multitest facility for computerized diagnostic data. In this facility
atients undergo a battery of automated tests; the results are tabulated via
omputer technology and presented to physicians for clinical analyses.

This building also houses the automated patient information system called
MEDLAB, a computerized system that gathers and disseminates continuous
hysiological data on critically ill patients in the University Hospital.



AFFILIATED HOSPITALS

Children's Hospital.—This is one of the largest and best known hospitals for children in the United States. Medical students receive training and clinical experience in pediatrics on both clinic and inpatient services. Special lectures and clinical work in child psychiatry are given in Children's Hospital.

Columbia Hospital for Women.—This 153-bed hospital, situated only two blocks from the University Hospital, is utilized by medical students at George Washington University for clinical training in obstetrics and gynecology. Each year about 12,000 patients are admitted, and there are 12,000 outpatient visits. Almost 5,000 deliveries and 7,000 gynecological operations are performed annually. Columbia Hospital for Women is an affiliated hospital for residency training in Obstetrics and Gynecology in the George Washington University Medical Center Program.

District of Columbia General Hospital.—The District of Columbia General Hospital, one of the largest general hospitals in the country, is a teaching facility for students in the School of Medicine.

The hospital has a bed capacity of approximately 950. It is the principal facility for the care of the indigent sick of the community. Annually, the out-patient department has over 193,360 clinic visits; approximately 98,[illegible] patients register in the emergency room, and 22,600 are admitted to the hospital. For the year 1970, the hospital had a record of 232,061 inpatient days. This is the largest emergency service in the District, where a wide variety of acute medical and surgical problems are examined and treated.

Fairfax Hospital.—This new and already expanding 530-bed voluntary community teaching hospital serves a burgeoning suburban area and provides clinical services including psychiatry. Each year over 20,635 patients are admitted, 4,900 babies delivered, 15,000 surgical operations performed, and 49,200 persons examined and treated in the Emergency Suite. Fairfax Hospital offers a rotating internship program, a School of Medical Technology, and clinical facilities for a School of Practical Nursing. Students of the School of Medicine serve at this hospital in clinical clerkship and elective programs. Fairfax Hospital is an affiliated hospital for residency training in Obstetrics and Gynecology in the George Washington University Medical Center Program.



St. Elizabeths Hospital.—St. Elizabeths Hospital, established by an act of ngress in 1855, is a federal psychiatric hospital administered under the De- tment of Health, Education, and Welfare. This hospital provides for the tment, care, and general well-being of approximately 6,000 patients of om 3,400 are resident. The facility includes a completely approved General spital to meet the needs for medical and surgical care and functions with a -time staff within the hospital plus attending physicians in various special- . The hospital maintains an up-to-date medical library.

Medical students of George Washington University utilize the facilities of Elizabeths for clinical psychiatric training. Opportunities for research are hanced by a cooperative arrangement with the National Institute of Mental alth of the United States Public Health Service.

Veterans Administration Hospital.—In addition to the medical, surgical, chiatric, neurological, tubercular, and physical medicine and rehabilitation vices, this 700-bed hospital has a large outpatient program; an extensive ical research program; programs in open heart surgery, cobalt therapy, renal dialysis; a metabolic program; and a specially designed Administra- e Research Laboratory.

Washington Hospital Center.—This 843-bed private, voluntary institution ves the greater Washington area through a triad of activities: patient care, ching, and research. The Center is the tenth busiest of more than 7,000 spitals in the United States and the second busiest private hospital in terms inpatient admissions. A very active emergency service cares for more than ,000 patients a year, and the 50 clinics provide all major clinical service cept pediatrics for about 65,400 outpatients and 31,740 inpatients yearly. addition to an extensive approved internship and residency program, the nter offers organized instruction for nurses, laboratory and X-ray tech- ians, medical secretaries, and other health-related vocations.

VERNMENT MUSEUMS

e Armed Forces Institute of Pathology, on the grounds of Walter Reed my Medical Center, affords unexcelled opportunity for study of conditions t in general medicine and surgery as well as those of special military signifi- nce. Its collection of anatomical and pathological specimens comprises ma- ial received from all areas of the world and is unequalled in this country. e Museum of Hygiene, the National Museum, the Smithsonian Institution, e Botanic Gardens, and the various collections of the Department of Agri- lture all afford opportunity for study of materials of special interest in vari- s areas of medicine and its allied sciences.

OFFICERS OF ADMINISTRATION OF THE MEDICAL CENTER

hn Parks, M.S., M.D., *Dean of the Medical Center*

mes Joseph Feffer, B.A., M.D., *Associate Dean of the Medical Center, for Clinical Affairs*

Lawrence Alfred Lowe, B.A., Ed.M., *Associate Dean of the Medical Center, for Research*

rank Nelson Miller, Jr., B.S., M.D., *Associate Dean of the Medical Center, for Student and Curricular Affairs*

onald Paul Kaufman, B.S., M.D., *Medical Director of the University Hospital*

OFFICERS OF ADMINISTRATION OF THE MEDICAL CENTER


Dr. Parks


Dr. Feffer

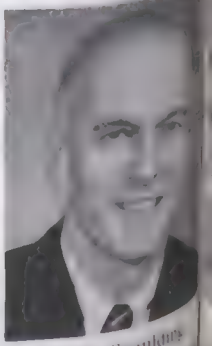

Mr. Lowe


Dr. Miller


Dr. Kaufman

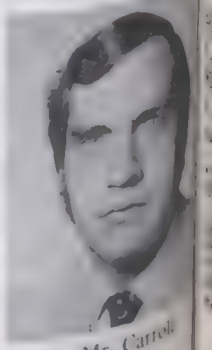

Dr. Klopp


Mr. Ludewig


Mr. Spaulding


Mr. Joy


Mr. Hames


Mr. Carroll

vin Trexler Klopp, B.A., M.D., *Medical Director of the University Clinic*
tor Frederick Ludewig, B.S., *Administrator for Clinical Affairs*
lip Whitney Spaulding, B.A., M.S., *Administrator of the University Hospital*
l Walter Joy, B.A., M.S., *Associate Administrator for Clinical Affairs*
ald Knox Hames, B.S., *Budget Officer of the Medical Center*
mas James Carroll, B.B.A., *Associate Budget Officer of the Medical Center*
ella Frances Young, M.S., *Librarian of the Medical Center*

EXECUTIVE FACULTY OF THE SCHOOL OF MEDICINE*

fessors J.P. Adams, P.C. Adkins, M.F. Armaly, Paul Calabrisi, C.S. Coakley, V.H. Cohn, Jr., F.C. Derrick, B.S. Epstein, H.L. Feffer, J.J. Feffer, Murdock Head, R.S. Higdon, W.N. Jensen, G.A. Kelser, Jr., R.A. Kenney, C.T. Klopp, H.G. Mandel, A.M. Margileth, J.W. Millar, F.N. Miller, Jr., Sean O'Reilly, John Parks, R.C. Parlett, R.H. Parrott, T.M. Peery, J.E. Rankin, H.V. Rizzoli, Mary Louise Robbins, S.D. Rockoff, J.G. Sites, B.W. Smith, J.C. Smith, Harold Stevens, I.R. Telford, C.S. Tidball, C.R. Treadwell, W.S. Yamamoto

ical Professors W.S. McCune, M.M. Parks

ociate Professors W.R. Ayers, M.L. Elgart, J.L. Fox, R.P. Kaufman, W.J. Nelson

ociate Clinical Professors J.J. McFarland, Jr., W.P. McKelway, F.T. Reuter

istant Professor E.N. Kassira

istant Clinical Professor J.L. Levine

ociate Dean of the Medical Center, for Research C.A. Lowe

ministrator for Clinical Affairs V.F. Ludewig

MMITTEES†

E DEAN'S COUNCIL

lla Brown, C.S. Coakley, Milton Gusack, R.A. Kenney, H.G. Mandel, J.G. S, C.W. Thompson, C.R. Treadwell, N.T. Tsangaris, Susan Bane *(Student resentative)*, D.G. Lewis *(Student Representative)*, J.H. McClenathan *(Student Representative)*

MMITTEE ON ADMISSIONS

l Calabrisi, *Chairman*
in Affronti, D.H. Glew, Jr., Milton Gusack, Robert Keimowitz, Marilyn ering, Joseph Lindsay, Jr., A.M. Margileth, W.G. Tompkins, Glenn Walker, . McClenathan *(Student Representative)*, C.L. Myles *(Student Represen-*

---

e Executive Faculty, Dean's Council, and committee members are for the academic year 1971–

e President of the University, the Vice President for Academic Affairs, the Registrar of the versity, the Director of Admissions of the University, and the Director of Libraries of the e Dean and Associate Deans of the Medical Center, the Medical Director of the University pital, the Medical Director of the University Clinic, the Administrator for Clinical Affairs, and President of the Medical Alumni Association are ex officio members of all committees

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Tsangaris, G.V. Vahouny, C.M. Briggs *(Student Representative)*, R.C. Re
(Student Representative), P.M. Sarafan *(Student Representative)*

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G.L. Wright, Jr.

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off, Harold Stevens, F.W. Wolff, B.J. Ammerman *(Beaumont Society Re
sentative)*

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Pierpont, H.V. Rizzoli, Janet Vickery, Elizabeth Adams *(Student Repres
tive)*

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Marlow, J.P. Naughton, William Newman, J.J. Rheingold, H.J. Zimmer
D.J. Donohue *(Student Representative)*

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stam, Jane Lingo, J.F. Mermel, P.W. Spaulding, M.D. Manley (St
Representative)

STEERING COMMITTEE ON DATA PROCESSING

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J.K. Cooper, C.H. Klingenmaier, V.F. Ludewig, J.W. Millar, C.S. Tidb

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J.M. Bailey, Marie Cassidy, W.L. Joseph, L.S. Lessin, B.C. Zook

COMMITTEE ON AUDIO-VISUAL SERVICES

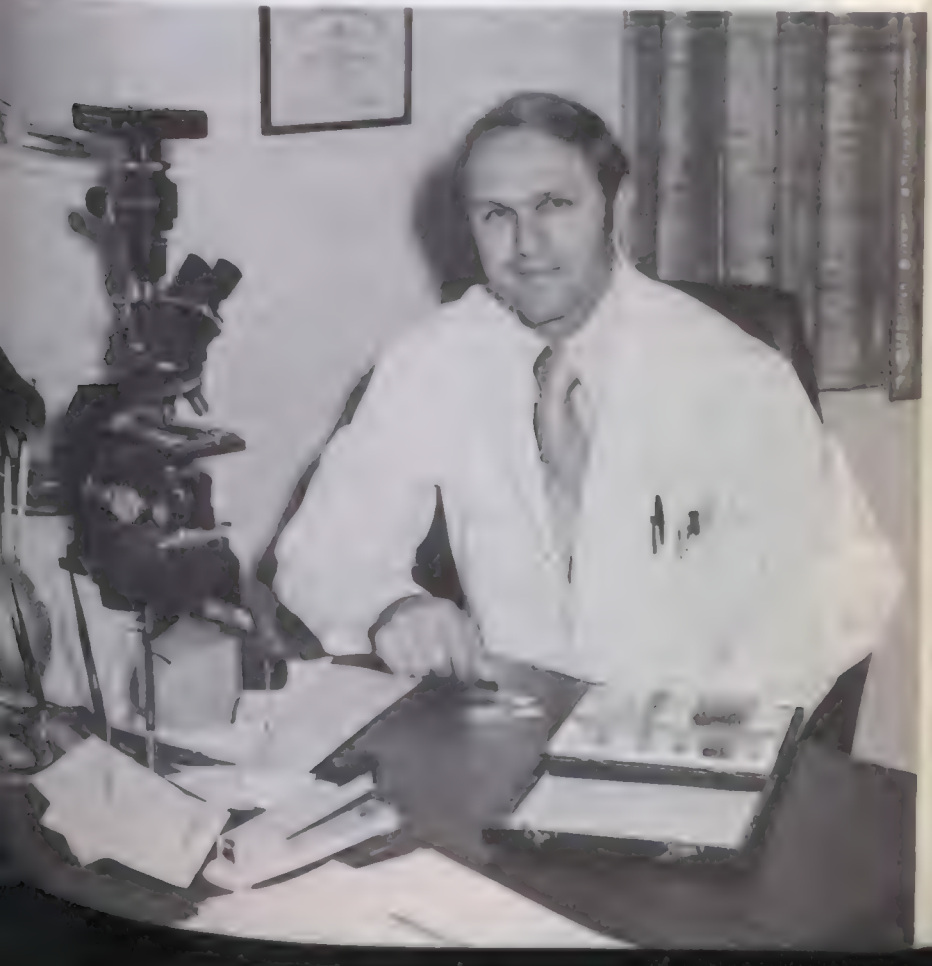
F.D. Allan, *Chairman*
P.C. Chalmers, W.O. Dobbins, III, R.A. Lavine, Arthur Peschin, Benny Waxman, Peter Starke *(Student Representative)*

COMMITTEE ON RESEARCH FACILITIES

C.A. Lowe, *Chairman*
W.L. Joseph, R.P. Kaufman, H.G. Mandel, A.E. Parrish, C.R. Treadwell

STUDENT ADVISORY COMMITTEE TO THE DEAN

Susan Bane, D.H. Burstein, R.C. Gloster, D.G. Lewis, Jason Mann, J.H. McClenathan, G.M. McCullars, R.W. Schulz



COURSES OF INSTRUCTION

PLAN OF INSTRUCTION FOR THE DOCTOR OF MEDICINE DEGR

THE FACULTY AND ADMINISTRATION of the School of Medicine have develo
and initiated a program of medical education through careful study of p
performance, present opportunity, and future need.

Students differ widely in their interests and abilities. Each student is
couraged to maximal achievement within his own limits. This is accomplish
by a balanced program of required and elective courses that permit indivi
scholarly development in specialized medical sciences and research.

The curriculum provides graduated instruction, beginning with the ba
medical sciences and expanding to include the more complex aspects of hea
maintenance and care of the sick. It provides a broad basic preparation fo
career in medicine.

In the first year, the schedule begins with an orientation period designed
introduce the new students to the Faculty, the upperclassmen, and the envir
ment for their medical education.

The first semester is devoted to the study of the sciences (anatomy and
chemistry) concerned with the structure and composition of the normal hu
body. In the second semester of the first year, the science of normal func
is further emphasized by courses in physiology. These studies of the norm
provide a basis for emphasis on health maintenance, which is a strong p
tive characteristic of the University's new teaching program. During the sec
semester the student is also introduced to the concept of disease in a course
microbiology, where the various microbial agents and their effects upon
human body are studied. A basic behavioral science course in this semes
deals with the normal development of the person. Elective courses are offe
in the second semester of the first year and provide an opportunity for
student to begin the development of special interests under the guidance
skilled advisers.

The basic courses of the first semester of the second year are pathol
pharmacology, and psychopathology. In pathology the student learns the n
and causes of disease as well as the alterations produced by disease in
tissues and fluids of the human body. He learns to recognize and evalu
the significance of the abnormal. Pharmacology provides an understanding
the mode of action of the various agents employed in the treatment of
sick, and emphasizes the safest and most effective means for their use. Psy
pathology introduces the student to aberrant mental mechanisms. Opportun
for elective study are increased during the second year.

The second semester of the second year is planned to acquaint the student with the principles and methods of clinical diagnosis and therapy, and to develop in him an awareness of the physician's responsibility to his patients. The basic concepts of laboratory medicine are taught in special laboratory facilities. During the second semester of the second year, three half-days are available each week for the electives in pathology and pharmacology.

During the third and fourth years, each student has a 12-month rotating clinical clerkship assignment in the University Hospital and Clinic and in affiliated hospitals. Patients with a wide variety of illnesses are assigned to each



student for close personal study under the guidance of a faculty skilled in various specialties of medical practice. In the course of the clerkship, student is given increasing responsibility as he demonstrates competence professional maturity.

During a 28-week career elective period, each student has an opportu to explore general practice, specialty practice, or areas of research which be of help in deciding the direction of his career. Students with exceptio interests and proven ability may be permitted to spend their elective period other universities, including those of foreign countries, but most students find ample opportunities in the University's own published schedule of appro mately 150 different electives for seniors.

Courses in the recently established Department of Clinical Engineering available for elective credit to students interested in this increasingly importa field.

CURRICULUM

		A. The Basic Medical Sciences
FIRST YEAR	TERM I (16 weeks)	ANATOMY AND BIOCHEMISTRY
	TERM II (16 weeks)	PHYSIOLOGY, MICROBIOLOGY, AND BASIC PSYCHIA plus 3 semester-hour credits of electives in Anatomy Biochemistry
(16-week vacation)		
SECOND YEAR	TERM III (16 weeks)	PATHOLOGY, PHARMACOLOGY, AND BASIC PSYCHIA plus 3 semester-hour credits of electives in Physio and Microbiology
		B. Introduction to Clinical Medicine
	TERM IV (16 weeks)	PHYSICAL DIAGNOSIS, LABORATORY MEDICINE, INT DUCTORY CLINICAL LECTURES plus 4 semester-hour credits of electives in Patho Pharmacology, and others
(16-week vacation)		
THIRD AND FOURTH YEARS (the last 88 weeks in rotation, including 8-week vacation)	CLINICAL CLERKSHIPS (52 weeks)	**C. Patient Care** INPATIENT CLERKSHIPS: Anesthesiology (2 weeks), Psychiatry (4 weeks), cine (12 weeks), Surgery (12 weeks), Obstetrics Gynecology (8 weeks), Child Health and Develop (8 weeks) OUTPATIENT CLERKSHIPS: General Medicine and Emergency Room (6 weeks
	ELECTIVES (28 weeks)	**D. Career Electives** SUPPLEMENTARY CLINICAL CLERKSHIPS OR SCIENCE OR CLINICAL RESEARCH

GENERAL INFORMATION ON COURSES OF INSTRUCTION

he School of Medicine serves other divisions of the University by making ailable to nonmedical students certain undergraduate and graduate courses the following departments: Anatomy, Biochemistry, Epidemiology and vironmental Health, Microbiology, Pathology, Pharmacology, and Physi-ogy. The courses listed are subject to some slight change. The University serves the right to withdraw any course announced.

AFF OF INSTRUCTION

he Staff of Instruction listed under each Department is for the academic year 71-72.

PLANATION OF COURSE NUMBERS AND SYMBOLS

number in parentheses after the name of the course indicates number of mester hours of credit which may be earned.

Courses numbered from 101 to 200 are for third- and fourth-year Colum-n College of Arts and Sciences students.

Courses in the basic science departments are numbered from 201 to 400. ey are for medical students and graduate students in the Arts and Sciences. With the exception of 200-series basic science courses offered by some nical departments, courses in the clinical departments are numbered from 1 to 400 and are limited to medical students.

EY TO ABBREVIATIONS

he following abbreviations are used in this catalogue for course designations ed by students in registering for classes.

Anat	Anatomy
Anes	Anesthesiology
Bioc	Biochemistry
Chem	Chemistry
ChHD	Child Health and Development
ClEn	Clinical Engineering
ClSc	Clinical Sciences
Derm	Dermatology
Epid	Epidemiology and Environmental Health
Math	Mathematics
M&PA	Medical and Public Affairs
Med	Medicine
Micr	Microbiology
N Su	Neurological Surgery
Neur	Neurology
Ob&G	Obstetrics and Gynecology
Opth	Ophthalmology
Orth	Orthopaedic Surgery
Otol	Otolaryngology
Path	Pathology
Phar	Pharmacology
Phys	Physics
Phyl	Physiology
Pchi	Psychiatry
Rad	Radiology
Surg	Surgery
Urol	Urology

EGISTRATION FOR CAREER ELECTIVES 1972–73

uring the senior year each student is required to complete seven career ectives of four weeks each. The remaining two 4-week periods are for cation.

Registration will be conducted on September 6, 1972, for the first five riods: September 11 through October 8, 1972; October 9 through November 1972; November 6 through December 3, 1972; December 4 through

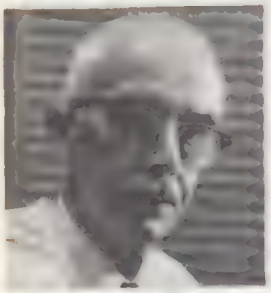
SCHOOL OF MEDICINE DEPARTMENT CHAIRMEN



Dr. Telford, *Chairman*
Anatomy



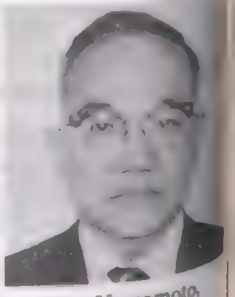
Dr. Coakley, *Chairman*
Anesthesiology



Dr. Treadwell, *Chairman*
Biochemistry



Dr. Parrott, *Chairman*
Child Health
and Development



Dr. Yamamoto,
Chairman
Clinical Engineering



Dr. Higdon, *Chairman*
Dermatology



Dr. Millar, *Chairman*
Epidemiology and
Environmental Health



Dr. Head, *Chairman*
Medical and
Public Affairs



Dr. Jensen, *Chairman*
Medicine



Dr. Parlett, *Chairman*
Microbiology



Dr. Rizzoli, *Chairman*
Neurological Surgery



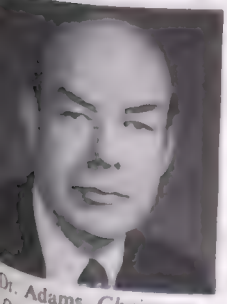
r. O'Reilly, *Chairman*
Neurology



Dr. Sites,
Acting Chairman
Obstetrics and Gynecology



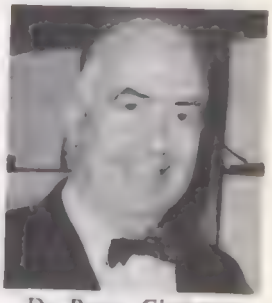
Dr. Armaly, *Chairman*
Ophthalmology



Dr. Adams, *Chairman*
Orthopaedic Surgery



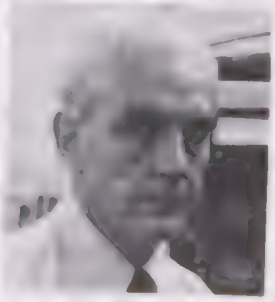
Dr. McFarland,
Chairman
Otolaryngology



Dr. Peery, *Chairman*
Pathology



r. Mandel, *Chairman*
Pharmacology



Dr. Kenney,
Acting Chairman
Physiology



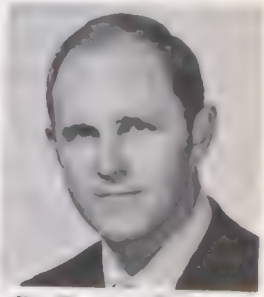
Dr. Rankin,
Acting Chairman
Psychiatry



r. Rockoff, *Chairman*
Radiology



Dr. Adkins, *Chairman*
Surgery



Dr. Derrick, *Chairman*
Urology

December 31, 1972; January 2 through January 28, 1973. Registration wi
conducted in January, 1973, for the four remaining periods—January
through February 25, 1973; February 26 through March 25, 1973; March
through April 22, 1973; and April 23 through May 20, 1973. Special arra
ments for registration in January will be made for students who are
on electives.

Anatomy

Chairman: I.R. Telford

Professors I.R. Telford, Paul Calabrisi, C.M. Goss *(Visiting—Medical Hist*
F.D. Allan, T.N. Johnson
Professorial Lecturers J.L. Angel, T.S. Reese
Associate Professor J.B. Christensen
Associate Clinical Professor R.N. Brown
Associate Professorial Lecturers J.A. Di Paolo, L.E. Church, Joan Blanch
Mackie, A.L. Shabo
Assistant Professors E.N. Albert, Marilyn Koering

*201 **Anatomy** (12)
All anatomical disciplines are integrated: regional gross dissection,
ogy, neuroanatomy, embryology. (Fall)

202 **Gross Anatomy** (6) Calabrisi and
For graduate students. Regional dissections of adult cadaver supplem
with lectures and X-rays. Laboratory fee, $30. (Fall)

203 **Human Embryology** (1)
For graduate students. Origin and development of human body; em
on value of embryology in interpreting anatomical anomalies.

204 **Neuroanatomy** (2) Johnson an
For graduate students. Gross and microscopic anatomy of central ne
system and special senses. Laboratory fee, $13. (Fall)

205 **Microscopic Anatomy** (3) Telford an
For graduate students. Microscopic structure of cells, tissues, and
of the human body. Laboratory fee, $13. (Fall)

221–22 **Seminar** (1–1) Johnson an
For graduate students. Research reports and discussions of special
by staff and graduate students. Medical students encouraged to
(Academic year)

249 **Introduction to Anatomical Research** (1) Telford and
For graduate students. Major research techniques as applied to
materials in the various anatomical disciplines. (Fall)

* Required for medical students.

252 **Physical Anthropology** (1) — Angel

Variations in man and factors affecting him, human evolution and racial differences, anatomy and culture of ancient man. (Spring)

254 **Fetal Anatomy** (2) — Allan

Dissection of early and late human fetus. Comparison of fetal and adult structures. 20 students. Laboratory fee for nonmedical students, $10. (Spring)

256 **Human Genetics** (1) — C.B. Jacobson

General principles of genetics, new cytogenetics techniques, aneuploidy in man and its significance, biochemical aspects of heredity, genetic counseling. (Spring)

258 **Cytology** (3) — Albert and Staff

Detailed study of morphology and function of the cell and its organelles. Basic cytological techniques emphasized. Laboratory fee for nonmedical students, $20. (Spring)

260 **Electron Microscopy in Cellular Biology—Lecture** (1) — Koering, Blanchette-Mackie, Albert

Anat 260 may be taken without 261. (Spring)

261 **Electron Microscopy in Cellular Biology—Laboratory** (2) — Koering

Prerequisite or concurrent registration: Anat 260. 12 students. Laboratory fee for nonmedical students, $15. (Spring)

262 **Gross Anatomy of Upper and Lower Extremities** (2) — Calabrisi

Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. 24 students. Laboratory fee for nonmedical students, $10. (Spring)

264 **Gross Anatomy of Head and Neck** (2) — Christensen

Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. 24 students. Laboratory fee for nonmedical students, $10. (Spring)

266 **Gross Anatomy of Thorax and Abdomen** (2) — Christensen

Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. 24 students. Laboratory fee for nonmedical students, $10. (Spring)

268 **Gross Anatomy of Pelvis, Perineum, and Lower Extremity** (2) — Calabrisi

Detailed dissection, supplemented by X-ray anatomy; discussions, assigned reading. 24 students. Laboratory fee for nonmedical students, $10. (Spring)

270 **Dissection of the Human Brain** (1) — Johnson

Dissection of major pathways and nuclei of the brain with consideration of ventricular system; conferences and assigned reading. 20 students. Laboratory fee for nonmedical students, $10. (Spring)

272 **Autonomic Nervous System** (1) — Allan

Development, microscopic and gross anatomy, function of central and peripheral components of autonomic nervous system. (Spring)

274 **Tissues of the Body** (1) Telford and

Basic concepts in anatomy, with emphasis on primary tissues of the —their histogenesis, growth, functions, regenerative capacities, death. (Spring)

276 **Advanced Studies in Anatomy** (1) Telford and

Lectures and conferences on selected anatomical subspecialities— crinology, teratology, growth, etc. May be repeated for credit. (Sp

278 **History of Anatomy and Surgery** (1)

Lectures and discussions related particularly to the lives and times of standing contributors to the advancement of the science of anatomy surgery. (Spring)

279 **Regional Anatomy** (5) Christe

Advanced dissection of abdomen, thorax, or head and neck. 4 se 4-week elective periods. School of Medicine (September–May)

280 **Regional Anatomy** (5) Cal

Advanced dissection of upper and lower extremities, or lower extre and pelvis. 4 seniors; 4-week elective periods. School of Medicine (January 29–March 25)

281 **Neonatal Anatomy** (5)

Detailed dissection of newborn or late fetus. 4 seniors; 4-week el periods. School of Medicine (January 29–March 25)

282 **Advanced Neuroanatomy** (5) Jo

Detailed dissection of human adult brain. 5 seniors; 4-week el periods. School of Medicine (January 29–March 25)

283 **Introduction to Neuroanatomical Research** (5) Jo

Techniques and principles of research in neuroanatomy. 5 seniors elective periods. School of Medicine (January 29–March 25)

284 **Experimental Teratology** (10) Te

Congenital abnormalities in animals induced by various experim methods. 2 seniors; 8-week elective periods. School of Medicine (September–May)

286 **Microangiography and Microradiography** (5) Christ

Intimate vasculature of selected organs by injection and radiogra 2 seniors; 4-week elective periods. School of Medicine (Septe May)

287 **Human Cytogenetics** (10) C.B. Ja

Chromosomal research on reproductive anomalies, congenital m tions, mutagenic assay. Tissue culture, photomicrography, kar analysis, genetic counseling. 2 seniors; 8-week elective periods Hosp. (September–May)

295 **Research** (arr.)

Content differs each time course is offered; may be repeated on credit. Fee to be arranged. (Fall and spring)

299–300 **Thesis Research** (3–3)

(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

esthesiology

man: C.S. Coakley
iate Chairman: B.S. Epstein

essors C.S. Coakley, Seymour Alpert, B.S. Epstein
ciate Professors Paula Kaiser, Patricia Russell, Marie-Louise Kennedy, rthur Peschin, G.A. Morales, Herbert Weintraub
tant Professors C.H. Klingenmaier, Hildegard Manitsas, Mary Salto, B.S. unbar, M.J. Shaffer *(Research)*
tant Clinical Professors S.N. Albert, W.E. Bageant, K.J. Hassan, Chalom lbert, Philip Lowenthal, R.R. Ritter
uctors J.B. Craft, Jr., J.I. Auñón *(Research)*
cal Instructors Nan-Huan Char, C.D. Lee

302 **Clinical Clerkship** Staff
Clinical preoperative evaluation, surgical and obstetrical anesthesia, infant and adult resuscitation, inhalation therapy, management of patients in coma, shock, and other problems which may be encountered in medical practice. 1 week—Univ. Hosp., 1 week—Wash. Hosp. Center (2-week periods throughout academic year)

380 **Anesthesiology** (5) Weintraub
Clinical preoperative evaluation, surgical and obstetrical anesthesia, infant and adult resuscitation, inhalation therapy, monitoring and blood gas determinations. 2 seniors; 4-week elective periods, Univ. Hosp. (September–May)

381 **Anesthesiology** (5) Lowenthal
Clinical preoperative evaluation, surgical and obstetrical anesthesia, infant and adult resuscitation, inhalation therapy; blood volume determinations. 2 seniors; 4-week elective periods. Wash. Hosp. Center (September–May)

383 **Pediatric Anesthesia** (5) Staff
Clinical preoperative evaluation, pediatric anesthesia, infant resuscitation. 2 seniors; 4-week elective periods. Children's Hosp. (September–May)

384 **Special Care Unit** (5) Klingenmaier, Dunbar
Evaluation and management of respiratory failure, rationale and use of automatic ventilators, chronic airway management, cardiovascular sup-

ed for medical students. Part of Med 306. Credit assigned after completion of Med 306.

port, and intensive care. 1 senior; 4-week elective periods. Univ. H
(September–May)

385 **Automated Patient Monitoring** (5) Klingenm
Automated patient monitoring techniques, introduction to programm
of physiologic data for the management of critically ill patients. 2 sem
4-week elective periods. Warwick Bldg. (September–May)

390 **Extramural Anesthesiology Elective** (arr.)
The Department may arrange for selected medical students to sp
elective periods at other institutions. Interested students should con
Dr. Herbert Weintraub.

Biochemistry

Chairman: C.R. Treadwell

Professors C.R. Treadwell, B.W. Smith, G.V. Vahouny, J.M. Bailey
Professorial Lecturers W.W. Burr, Jr. *(Isotopes)*, R.W. Albers *(Brain)*, Ro
Brady, Jr. *(Brain)*, A.E. Schaefer, Edward Steers, Jr., W.F. Anderson
netics), H.L. Ozer, Gordon Guroff, Martin Flavin, A.N. Schechter
Assistant Professors Glenn Walker, Linda Gallo *(Research)*, Barbara How
(Research)
Lecturer P.H. Fishman
Special Lecturers Walter Mertz *(Inorganic Metabolism)*, J.C. Smith, Jr.

*201 **Medical Biochemistry** (8)
Lectures and laboratory; emphasis on basic principles and their relat
to medicine. (Fall)

221–22 **General Biochemistry** (4–5) Vahou
For graduate students. Lectures and laboratory. Prerequisite: Chem
54. Material fee, $20 a semester. (Academic year)

224 **Biochemistry of Enzymes** (1)
Biochemistry of enzymes and enzyme reactions. Prerequisite: Bioc 3
221. (Spring)

225 **Biochemistry Procedures** (3) B. Smith and S
Laboratory course. Material fee for nonmedical students, $16. Cont
differs each time course is offered; may be repeated for credit.
and spring)

227 **Biochemistry Seminar** (1)
Current literature in biochemistry, mainly for graduate students, but
to limited number of specially qualified medical students. Content d
each time course is offered; may be repeated for credit. (Fall
spring)

232 **Proteins and Amino Acids** (1)
Prerequisite: Bioc 221. (Spring)

* Required for medical students.

241 **Isotopes** (3) **Burr**

Theoretical characterization of isotopes and their applications in biology and medicine. Attention given to counting, health physics and radiation safety, autoradiography, chromatography. Laboratory fee for nonmedical students, $16. (Spring)

251 **Carbohydrate Metabolism** (1)

Prerequisite: Bioc 201 or 222. (1973–74 and alternate years: spring)

252 **Biochemistry of the Brain** (1) **Albers, Brady**

For medical students; open to limited number of graduate students. Recent biochemical developments in structure, functions, and metabolic processes unique to the brain. (Spring)

254 **Human Nutrition** (1)

For medical students; open to limited number of graduate students. Application of nutritional principles in humans. (Spring)

256 **Biochemistry of Organ Function** (1) **N. Kramer**

For medical students; open to limited number of graduate students. Emphasis on biochemical processes unique to particular organ systems; application of these processes to evaluation of function. (Spring)

258 **Inherited Metabolic Diseases** (1) **Ozer**

For medical students; open to limited number of graduate students. Contribution of molecular biology to understanding of human mutations and hereditary diseases. Specific disease states and genetics of protein structure discussed. Prerequisite: Bioc 222. (Spring)

260 **Biochemistry of the Steroids** (1) **O. Dodek**

For medical students; open to limited number of graduate students. Basic chemistry of the steroids, pathways of biosynthesis and metabolism, regulatory mechanisms, physiologic effects, clinical measurement of endogenous steroids, clinical manifestations of steroid imbalance, steroid changes in pregnancy, and steroid therapy. (Spring)

262 **Biochemistry of the Lipids** (1) **Vahouny**

For graduate students; open to maximum of 15 medical students. 1972–73 and alternate years: metabolism of lipids, including digestion, energy production, biosynthesis, function in specialized tissues and subcellular structures. 1973–74 and alternate years: chemistry, properties, occurrence of important classes of biological lipids. Content differs each time course is offered; may be repeated for credit. (Spring)

266 **Biochemical Genetics** (1) **Anderson**

For medical students; open to limited number of graduate students. (Spring)

268 **Biochemistry of Bone and Muscle** (1) **Walker**

Study of structure, chemistry, and biochemistry as they relate to the normal and diseased states of bone and muscle; emphasis on current theories and techniques. (Spring)

279 **Research in Renal Function, Mutarotase, and Sugar Transport** (10) **Bailey**

Clinical significance of plasma mutarotase levels in kidney disease. 2

seniors; 8-week elective periods. School of Medicine (Septemb
May)

280 **Research in Experimental Atherosclerosis** (10) Ba
Study of factors influencing the development and course of atherosclero
in rabbits. 2 seniors; 8-week elective periods. School of Medic
(September–May)

281 **Research in Biochemistry of Carbohydrates and Enzymes** (10) B. Sh
Research in a problem already under investigation in the Department
a project in related fields suggested by the student. 2 seniors; 8-w
elective periods. School of Medicine (September–May)

282 **Research in Biochemistry of Lipid Metabolism and Transport** (10) Vahou
Biochemical investigation of a clinical problem involving lipids of spe
interest to the student, or participation in existing research program in
Department. 2 seniors; 8-week elective periods. School of Medi
(September–May)

283 **Research in Metabolic Regulation within the Heart** (10) Vahou
Studies on metabolic regulation and effects of drugs. 2 seniors; 8-w
elective periods. School of Medicine (September–May)

286 **Research on Transfer RNA and Protein Biosynthesis in Normal and Tumor Cells** (10) R.C. Gal
Investigative work on isolation and purification of RNA fractions
function in protein synthesis in cell-free systems from normal and spe
cells. 2 seniors; 8-week elective periods. National Cancer Inst
(September–May) Wa

287 **Research in Biochemistry of B_{12} Coenzymes** (10)
Research in a problem under investigation in the Department. 2 se
8-week elective periods. School of Medicine (September–May)

290 **Extramural Biochemistry Elective** (arr.)
The Department may arrange for selected medical students to
elective periods at other institutions. Interested students should co
the Chairman of the Department.

295 **Research in Biochemistry** (arr.)
For 1st- and 2nd-year medical students and for graduate stu
Participation in a project under investigation in the Department or
a related field suggested by the student and approved by the Staff
tent differs each time course is offered; may be repeated for
(Fall and spring)

299–300 **Thesis Research** (3–3)
(Fall and spring)

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy
examination. May be repeated for credit. (Fall and spring)

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* Dr. Gallo is Senior Investigator at the National Cancer Institute.

399 **Dissertation Research (arr.)** **Staff**
Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

hild Health and Development

hairman: R.H. Parrott
ociate Chairmen: A.M. Margileth *(Student Affairs)*, D.W. Delaney *(House Staff and Medical Care)*, J.G. Randolph *(Surgical Division)*, J.C. Houck *(Research)*
rectors of Divisions: Gordon Avery *(Neonatology)*, M.J. Malone *(Neurology and Neurosurgery)*, M.M. Parks *(Ophthalmology)*, J.L. Levine *(Otolaryngology)*, M.S. Platt *(Pathology)*, D.W. Delaney *(Pediatric Medicine)*, Gloria Eng *(Physical Medicine and Rehabilitation)*, R.S. Lourie *(Psychiatry)*, J.M. LoPresti *(Radiology)*, J.G. Randolph *(Surgery)*

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ofessors R.S. Lourie, J.G. Randolph, R.H. Parrott, Spyros Doxiadis *(Visiting)*, S.L. Leiken, J.C. Houck *(Biochemistry)*, A.M. Margileth, M.J. Malone, Gordon Avery, D.W. Delaney, Wellington Hung, L.P. Scott III
inical Professors W.S. Anderson, L.E. Hoeck, W.A. Howard, J.A. Washington, Lois Murphy, Sydney Ross, William Stark *(Psychiatry)*, M.M. Parks, J.D. Noshpitz
ofessorial Lecturer R.B. Scott
ociate Professors Margaret Gutelius, Leon Cytryn *(Psychiatry)*, Dorothy Huntington *(Research)*, J.E. McClenathan, Rebecca Rieger *(Research)*, L.W. Perry, H.B. Richardson, Jr., Gloria Eng, Ann Barnet, T.H. Milhorat
ociate Clinical Professors T.E. Reichelderfer, S.I. Wolf, A.B. Coleman, Bennett Olshaker *(Psychiatry)*, Belinda Straight *(Psychiatry)*, G.J. Cohen, J.J. Francis *(Psychiatry)*, A.F. North, Jr.
istant Professors J.R. Puig, Nasser Movassaghi, C.A. Rigg, Ann Lodge *(Research)*, Lovisa Tatnall *(Research)*, G.P. August, E.N. Kraybill, M.W. Werthmann, Jr., C.D. Brandt *(Microbiology)*, H.W. Kim, S.I. Granger, Anne Fletcher, Shirley McMahon, Marilyn Renfield, Jane Todaro, R.P. Altman, J.S. Haller
istant Clinical Professors R.E. Martin, J.H. Peacock, Jr., Mary Sartwell, C.R. Stiegler, H.G. Clark, Adrian Recinos, Jr., C.R. Webb, Stephen Mourat *(Psychiatry)*, Erwin Friedman *(Psychiatry-Psychology)*, A.J. Modlin, A.E. Marans *(Psychiatry)*, Elma Denham *(Psychiatry)*, M.S. Glatt *(Psychiatry)*, D.H. McKnew, Jr. *(Psychiatry)*, P.C. Brunschwyler, L.A. Cove *(Psychiatry)*, D.P. Devaris *(Psychiatry)*, Milton Engel *(Psychiatry)*, H.T. Yates, Mary Fox, H.D. Knox, B.H. Ong, H.R. Gold, V.L. Guandolo, J.L. Chamberlain III, eonard Lefkowitz, J.G. Chopra, W.H. Barton *(Psychiatry)*, S.G. Werner, A B. Zients *(Psychiatry)*, G.W. Hardman, Jr., Iradj Mahdavi, J.L. Levine
ructors Beneta Peacock, Hiltje Irausquin *(Research—Biochemistry)*, Eduardo zcarate *(Psychology)*, Sylvia Wooten, Jocelyn Hicks, Cecilin Chisholm, elmut Brunner *(Research)*
ical Instructors H.H. Diamond, R.H. Mitchell, R.O. Warthen, Emilie Black, .H. Anderson, W.G. Preisser, Roger Bergstrom, S.Z. Goldblatt, Hilary

Millar *(Psychiatry)*, Harold Plotsky *(Psychiatry)*, Jean Lockhart, H.W. Ro
D.A. Young, George Joseph, F.A. Pedreira, S.L. Levin, Thomas Sulliva
R.M. Zakheim, M.L. Feldman, Lillian Osborne *(Psychiatry)*, Manouche
Rokni, Karen Olness, H.J. Steinfeld, S.L. Kaplan *(Psychiatry)*, Mary Flu
erfelt *(Psychiatry)*, D.R. Meers *(Psychiatry)*, M.D. Waters, M.E. Bra
G.W. Daisley, Jr., K.G. Kassebaum, Frances Min, Agnes Schweitzer, M.
Belfer, Sirus Amiri, Viola Cheng, Vichitur Chusuei

Special Lecturers G.A. Balfour, J.A. Bottiglione, C.J. Schulte III, F.P. Heal
Jr., J.W. Oberman, E.V. Soto, R.F. Hinckley, Susan Fisher, C.M. Berlin, J
Morris Feitel, M.I. Mones, Caroline Chandler

*303 **Pediatric Clerkship** (10) Margileth, Delan
Full-time, as part of resident team; ward rounds; work in outpati
department and specialty clinics under staff supervision; child psychia
and child guidance, lectures, clinical conferences, grand rounds. Childre
Hosp. (Annual, continuous 8-week rotation)

376 **Pediatric Neurology** (5 or 10) Malone, Haller, K. Nelso
Participation in diagnostic and therapeutic studies on inpatients and ou
patients. Rounds, conferences, seminars. 2 seniors; 4- or 8-week electi
periods. Children's Hosp. (September–May)

377 **Community Health Development** (5 or 10) Hinckle
Public health preventive and community medicine as it is conducted
the Health Department of Montgomery County, Maryland. Opportuni
to work in outlying health center satellites, central pediatric specia
clinics, and to become familiar with school health programs and provi
1 senior; 4- or 8-week elective periods. (September–May)

379 **Developmental Neurology** (5) Richardso
Application of developmental neurology to learning problems in
school-aged children. 2 seniors; 4-week elective periods. (Septembe
May)

380 **Clinical Pediatrics** (5) Margileth, Puig, Tod
Full-time, as part of resident team; wards, outpatient department, an
specialty clinics under staff supervision. Participation in diagnostic studie
therapeutic procedures, rounds, and conferences. 6 seniors; 4-week elec
periods. Children's Hosp. (September–May)

381 **Pediatric Allergy** (10) Howa
Introduction to pediatric allergy, clinics and wards, some experience
experimental techniques and preparation of extracts. 1 senior; 8-wee
elective periods. Children's Hosp. (September–May)

382 **Pediatric Radiology** (5) LoPre
Diagnostic and therapeutic radiology, diagnostic procedures. 2 seni
4-week elective periods. Children's Hosp. (September–May)

384 **Newborn and Premature** (5) Kraybill, Reyn
Clinical studies in newborn care emphasizing hematologic problems
congenital malformations; daily rounds, conferences, research studies
cytogenetics. 2 seniors; 4-week elective periods. Univ. Hosp.
(September–May)

* Required for medical students.

385 **Child Psychiatry** (5) — Cove

Diagnostic and follow-up studies on inpatients and outpatients; rounds, conferences, seminars; visits to related community facilities. 2 seniors; 4-week elective periods. Hillcrest Children's Center (September–May)

386 **Pediatric Hematology** (5) — Leikin

Clinical and laboratory studies of infants and children with hematologic disorders; bone marrow examinations. 1 senior; 4-week elective periods. Children's Hosp. (September–May)

387 **Clinical Pediatrics** (5) — Soto

Care of newborn and children on inpatient basis; diagnostic studies, therapy; assigned reading. 2 seniors; 4-week elective periods. Fairfax Hosp. (September–May)

388 **Newborn Medicine** (5) — Avery, Fletcher

Observation and participation in the care of inpatient and outpatient infants. 1 senior; 4-week elective periods. Children's Hosp. (September–May)

389 **Pediatric Cardiology** (5) — Scott, Perry

Physical diagnosis of congenital and acquired heart diseases, interpretation of electrocardiograms and vectorcardiograms, cardiac catheterizations. 2 seniors; 4-week elective periods. Children's Hosp. (September–May)

390 **Extramural Pediatric Elective** (arr.)

The Department may arrange for selected students to spend elective periods at other institutions. Interested students should contact the Chairman of the Department.

391 **Cell Biology Research** (5 or 10) — Houck

Biochemical studies of normal and diseased human cells in culture. 2 seniors; 4- or 8-week elective periods. Children's Hosp. (September–May)

392 **Adolescent Medicine Clerkship** (5 or 10) — Rigg

Study of the normal developmental problems of adolescence. Experience in the medical care of adolescents. 2 seniors; 4- or 8-week elective periods. Children's Hosp. (September–May)

396 **Mental Retardation** (5 or 10) — Cytryn, Friedman

Diagnostic work-up of mentally retarded children and adolescents. Conferences, community resources. 2 seniors; 4- or 8-week elective periods. (September–May)

397 **Pediatric Clinical Laboratory** (5) — M. Platt, Margileth

Laboratory studies of infants and children correlated with clinical disease. In-depth review of laboratory diagnostic studies. 1 senior; 4-week elective periods. Children's Hosp. (September–May)

398 **Comprehensive Care** (5 or 10) — Oberman

Participating in both sick- and well-child care as administered in a comprehensive setting; experience in multidisciplinary approach; cooperative planning with other community agencies. 1 senior; 4- or 8-week elective periods. Comprehensive Health Care Program (September–May)

399 **Community Clinic** (5) Gra

Participation in an observation of a community clinic operation. 1 se
4-week elective periods. Morgan Clinic (September–May)

Clinical Engineering

Chairman: W.S. Yamamoto

Professors W.S. Yamamoto, H.V. Pipberger
Associate Professors W.R. Ayers, J.C. Aller
Associate Professorial Lecturer G.B. Devey
Assistant Professors J.R. Landoll, D.E. Winer
Assistant Clinical Professor H.A. Haessler

351 **Medical Engineering for Medical Students** (10) Fowler, Eisenber

Medical and engineering students paired whenever possible to provid
mutual introduction to the principles and practices of each disci
Seminar and lecture periods and participation in current laboratory
ects. Consultation with instructor required prior to enrollment. 2 seni
8-week elective periods. Univ. Clinic (September–May)

353 **Electronics and Computers** (10) Yamamoto and S

Instruction in the use of computers or electronic instrumentation in
cal problems. Areas include analysis of ECG, pulmonary function,
cal chemistry, file management, and mathematical modeling. Stud
grouped according to background and interest. Unlimited number
seniors; 8-week elective periods. Warwick Bldg. (September–May)

354 **Automated Medical Measurement Systems** (10)

Students work with a multidisciplinary group in the application of au
mated techniques to real-life problems in clinical medicine. Particip
in the design, implementation, and evaluation of multiphasic pa
screening system. 2 seniors; 8-week elective periods. Warwick Bldg
(September–May)

390 **Extramural Clinical Engineering Elective** (arr).

The Department may arrange for selected students to spend
periods at other institutions. Interested students should contact the Ch
man of the Department.

Clinical Sciences

SUBCOMMITTEE ON INTRODUCTION TO CLINICAL SCIENCES

N.T. Tsangaris *(Chairman)*, A.M. Margileth, T.E. Piemme, J.G. Rankin, [*] Waxman

[*] Dr. Eisenberg is Associate Professor of Engineering and Applied Science in the School of Engineering and Applied Science.

...ical Sciences, an interdisciplinary program, is required of medical students in ... fourth semester. By means of panel discussions, tutorials, case presentations, ...onstrations, and examinations of patients, it provides students with basic ...uction in the various clinical subjects and prepares them professionally and ...onally for the clinical clerkships and career electives of the third and fourth ... The program is coordinated by a Subcommittee of the Committee on ...cation Policy of the School of Medicine. The Subcommittee consists of members ...m the departments responsible for teaching the course.

*301 **Introduction to Clinical Medicine** (16) **Staff**

An integrated, organ-oriented, interdepartmental course providing fundamental instruction in anesthesiology, child health and development, dermatology, gynecology, internal medicine, neurology, obstetrics, ophthalmology, psychiatry, radiology, and surgery. Emphasis on physical diagnosis and laboratory medicine. Includes Life Cycle, dealing with the interpersonal relationships of the physician and his patients and their families. (Spring)

...rmatology

...irman: R.S. Higdon

...fessor R.S. Higdon
...ociate Professor Mervyn Elgart
...ociate Clinical Professor W.M. Narva
...istant Clinical Professors C.S. Brown, Manuel Landman, P.L. Repetto, Jr., ...Donald Mitchell, L.J. Eanet, W.R. Vineyard
...ical Instructors Phyllis Huene, H.S. Golomb, Maria Turner, Ronald Goldner
...cial Lecturers Gerda Landman, Naomi Kanof

380 **Dermatology Clinic** (5) **Vineyard**

Conferences, lectures, and attendance at Dermatology Clinic where patients with wide variety of dermatoses are seen. Diagnosis and treatment of common skin disorders. Dermatologic surgical procedures, technique for using liquid nitrogen, culture and identification of fungi, microscopic diagnosis of common cutaneous diseases. 2 seniors; 4-week elective periods. Walter Reed Gen. Hosp. (September–May)

381 **Dermatology Clinic** (5) **Goldner**

Same as Derm 380. 1 senior; 4-week elective periods. Andrews Air Force Base Hosp. (September–May)

382 **Dermatology Clinic** (5) **Higdon**

Same as Derm 380. 1 senior; 4-week elective periods. Univ. Clinic (September–May)

383 **Dermatology Clinic** (5) **Narva**

Same as Derm 380. 1 senior; 4-week elective periods. Nat'l. Naval Medical Center (September–May)

385 **Private Office Practice** (5) **Eanet**

1 senior; 4-week elective periods. (September–May)

...ured for medical students.

386 **Dermatology Clinic** (5)

Same as Derm 380. 1 senior; 4-week elective periods. Group
Asso., Inc. (September–May)

390 **Extramural Dermatology Elective** (arr.)

The Department may arrange for selected students to spend
periods at other institutions. Interested students should contact
Chairman of the Department.

Epidemiology and Environmental Health

Chairman: J.W. Millar

Professor J.W. Millar
Associate Professor C.R. Hartman
Associate Clinical Professors W.J. Zukel, L.S. Jaffe
Assistant Professors E.N. Kassira, Yousef Al-Doory, F.L. Hurley *(Biostatis*
Assistant Clinical Professors Lawrence Pyle, Jr., John Vinyard, Jr.
Assistant Professorial Lecturers S.H. Barboo, Jr., C.H. Miller, N.E. M
J.A. Lee, Olga Joly

*201 **Introduction to Epidemiology and Environmental Health** (2)

For medical students; open to qualified graduate students. Principles
methodology of epidemiology and biostatistics. Ecological approa
health and disease, including parasitology and mycology. (Spri

217 **Clinical Mycology** (2 or 4)
(*Formerly Advanced Mycology*)

Study of clinical aspects of mycotic diseases; emphasis on diagnos
disease and identification of etiologic agents. (Fall)

218 **Medical Parasitology** (1 or 2)

For medical students; open to qualified graduate students. Study of
parasite relationships. Clinical recognition of the important parasit
medicine. 10 2nd-year students. (Fall)

219 **Malariology** (1)

The general principles of the diagnosis, life cycle, pathogenicity,
ment, and prevention of malaria. Prerequisite: Epid 201 or equiva
(Fall)

230 **Biostatistics** (2 or 4)

Introduction to statistical analysis, theory of measurements and dis
tion, including significance testing, basic concepts of probability
association, sampling techniques, design of experiments, and introdu
to computers. (Fall and spring)

239 **Introduction to Computer Applications in the Health Sciences—FORTRAN** (1)

An 8-week course. Orientation to the use of large computers in a
environment. Use of FORTRAN, a computer independent language
the solution of simple computational tasks. (Fall and spring)

* Required for medical students.

240 **Computer Applications in the Health Sciences—PL/1** (1) — Millar and Staff

An 8-week course. Introduction to the use of PL/1 for the solution of advanced computational tasks. (Fall and spring)

295 **Research in Epidemiology** (arr.) — Staff

Participation in experimental studies in infectious diseases and research in community medicine. Admission by permission of Department. (Fall and spring)

299–300 **Thesis Research** (3–3) — Staff

(Fall and spring)

351 **Global Epidemiology** (1) — Staff

For medical students; open to graduate students by arrangement. Geographic pathology of disease and international aspects of disease prevention and control, including world demographic problems. (Fall)

352 **Seminar: Experimental Epidemiology** (2) — Hurley

For medical students; open to graduate students by arrangement. Student participation in definitions, design, and methods for developing epidemiologic studies of diseases. Prerequisite: Epid 230 or permission of instructor. 10 2nd-year students. (Fall)

353 **Military Preventive Medicine** (1) — Staff

Operational medicine, environmental and sanitation problems, epidemiologic diseases of military importance and their prevention and control. Medical aspects of aerospace and submarine medicine. 2nd-year medical students. (Fall)

354 **Seminar: Human Ecology** (1) — Lee and Staff

Ecology—man within the framework of reference—physical and cultural anthropology, geography, sociology, urban planning, public health, and public administration. (Fall)

355 **Clinical Effects of Air Pollution** (1) — Jaffe, Millar

Identification, description, and discussion of major air pollutants; chemical structure and function of the agents; toxicological and clinicopathological effects observed in man. (Fall)

380 **Methods in Public Health** (5 or 10) — Staff

Rotation through all divisions, including mental health, maternal and child health, environmental medicine, communicable diseases; field trips. 15 seniors; 4- or 8-week elective periods. D.C. Dept. of Public Health (September–May)

382 **Clinical Practice of Public Health** (10) — Staff

Application of ecological approach to problems of community health; emphasis on comprehensive care. Field experiences on such current issues as drug abuse, family planning, specific health needs of the aged, and other problems affecting delivery care systems. Seniors; 8-week elective periods. D.C. Dept. of Public Health (September–May)

384 **Research in Public Health** (10) — Staff

Supervised research; the student selects the topic from a broad range of public health problems, including mental health, maternal and child

health, environmental medicine, epidemiological methods, biostat
1 senior; 8-week elective periods. D.C. Dept. of Public Health
(September–May)

385 **Studies in Cardiovascular Disease** (5)

Participation in one or more current studies at the National Heart
Lung Institute; selection by the student. 2 seniors; 4-week elective per
(February 26–March 25)

387 **Diseases of the Tropics** (5 or 10)

Diagnosis, treatment, epidemiology, and laboratory aspects of
diseases; experience in the delivery of health care in the tropics. 1 se
4- or 8-week elective periods—to be arranged.

390 **Extramural Epidemiology Elective** (arr.)

The Department may arrange for selected medical students to
elective periods at other institutions. Interested students should con
the Chairman of the Department.

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for Doctor of Philosophy general exam
tion. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for cr
(Fall and spring)

Medical and Public Affairs

Chairman: Murdock Head

Professor Murdock Head
Professorial Lecturers R.D. Cotton, Thomas Bryant
Associate Professor C.W. Shilling

351 **Forensic Medicine** (2) Sharpe*, Hig

Open to sophomore medical students. Examples drawn from the
of problems arising when the professional interests of lawyers and
sicians overlap. Problem contexts include malpractice, personal
litigation, licensure and discipline, ethics and economics, hospitals
other institutions of practice, and compelled treatment. (Fall)

352 **Issues in Health Care** (1) Bryant, Cot

Contemporary health problems, such as poverty medicine, drug
health care delivery, and environmental health; physician's role in
to resolve these problems. Lectures; staff use of neighborhood clin
recent publications, and administrators of government programs lo
quartered in Washington. (Spring)

* Dr. Sharpe is Professor of Law in the University's National Law Center.

edicine

airman: W.N. Jensen
ociate Chairman: G.A. Kelser, Jr.
rectors of Divisions: Halla Brown *(Allergy)*, G.A. Kelser, Jr. *(Cardiology)*, W.O. Dobbins III *(Gastroenterology)*, T.E. Piemme *(General Medicine)*, L.S. Lessin *(Hematology-Oncology)*, L.K. Alpert *(Metabolic and Endocrine Diseases)*, D.J. Massaro *(Pulmonary Diseases)*, J.P. Naughton *(Rehabilitation Medicine)*, A.E. Parrish *(Renal Diseases)*, W.R. Felts, Jr. *(Rheumatology)*

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fessors M.J. Romansky, L.K. Alpert, J.M. Evans, A.E. Parrish, F.W. Wolff, Halla Brown, Irene Tamagna, J.J. Feffer, W.N. Jensen, T.E. Piemme, T.C. Chalmers, Leon Bernstein, J.P. Naughton, J.D. Chase, G.A. Kelser, Jr., S.M. Fox III, H.V. Pipberger, H.J. Zimmerman

nical Professors A.G. Prandoni, J.J. Rheingold, T.S. Sappington, A.B. Rosen baum, T.J. Greenwalt, Benjamin Manchester, L.E. Putnam, M.H. Stolar, C.W. Thompson, Morton Seidenfeld *(Clinical Psychology)*

ociate Professors W.R. Felts, Jr., Irene Siu, R.C. Fowler, Ariel Hollinshead *Research—Pharmacology)*, N.C. Kramer, Milton Corn, J.A. Curtin, J.K. iktora *(Research—Biochemistry)*, J.C. Penhos *(Research—Endocrinology)*, D.J. Massaro, J.B. O'Connell, Lawrence Pierce, W.O. Dobbins III, K.L. Becker, J.M. Bacos, J.D. Finkelstein, R.P. Kaufman, K.M. Stevens, Mah- mud Mourad, Tsung O. Cheng, L.S. Lessin, Joseph Lindsay, Jr., A.F. Mastellone *(Physical Medicine)*, O.S. Selawry, E.P. Benoit *(Research—Clini- Psychology)*, Karl Wipplinger, Gloria Eng, V.T. DeVita

ate Clinical Professors Joseph Ney, J.W. Latimer, Jr., T.J. Abernethy, F.S. Bacon, Elizabeth Hill, S.J.N. Sugar, H.D. Ecker, C.W. Jones, E.S. Gladsden, Maurice Mensh, F.J. Murray, E.P. Parker III, M.H. Rosenberg, Milton Gusack, Jack Kleh, H.M. Silver, J.P. Mann, Edward Adelson, R.R. Benton, S.D. Loube, Arthur Ruskin, C.A. Rosenberg, H.E. Ticktin, L.J. Thomas, W.O. Bailey, Jr., Ruth Benedict, Louis Ross, S.W. Kirstein, Israel Kessler, W.D. Brill, Marvin Fuchs, C.A. Schulman, Alfred Baer, Herbert Abramson, Bertel Nelson, J.M. Pisani, S.W. Bush, Joseph King, M.H. Jacob- son, J.P. Nasou, Raymond Standard, Henry Simmons

tant Professors F.A. Peck, P.A. Gorman, T.R. Shworles *(Research—So- al Psychology)*, S.H. Danovitch, Philip Witorsch, J.K. Cooper, P.M. Berk- man, Paul Hamosh, J.R. Shapiro, Robert Keimowitz, C.H. Chan, John La- Roza, J.C. Rios, D.H. Goodman, Geraldine Schechter, Raymond Haddad, W.S. Chiu, R.A. Rivera, S.A. Schroeder, M.H. Cohen, H.H. Hansen, Gloria Massaro *(Research—Pulmonary Diseases)*, J.F. Meyer, F.M. Muggia, D.S. O'Leary, P.O. Periman, K.J. Dickie, R.J. Karpick, P.M. Kini

tant Professorial Lecturer P.O. Wooley, Jr.

tant Clinical Professors T.A. Gonder, David Horwitz, R.B. Castell, S.T. Gibson, M.H. Rose, Adolph Friedman, R.B. Miller, F.D. Chapman, R.G. Taylor, J.W. Long, J.F. Ambury, T.L. Hartman, Boris Rabkin, L.A. Craig, Jr., W. Danish, Alvin Seltzer, C.E. Law, Sr., E.L. Rea, Conrad Gossels, H.O. Long, N.H. Rubenstein, W.L. Stone III, B.H. Ostrow, W.R. Ehrmantraut, A. Chapman, F.M. Gross, Eleanor Makel, Silas Babin, Jr., Alice Brigham, ek Crowell, D.S. Davis, J.H. Epstein, F.K. Harris II, R.F. Dyer, E.H. auerfeld, William Lewis, E.J. Leonard, H.I. Passes, C.W. Foulke, A.A. ar, O.W. Donnelly, R.S. Poole, H.C. Sadin, S.J. Talpers, W.L. Hall, George arpe, Raymond Scalettar, M.A. Sislen, G.C. Buchanan, G.T. Economos,

Irwin Ardam, S.E. Barr, H.A. Moskovitz, J.T. Hagenbucher, G.N. P
W.F. Morrissey, R.A. Apter, M.S. Artenstein, J.E. Stauch, Jean Lucas, B
Cooperman, Francis Chucker, Gilbert Hurwitz, R.S. Wilkinson, W.E. G
linek, L.H. Biben, W.H. Harvey. William Kurstin, Dorothea Chapman, I
Fenton, C.W. Humphreys, Jr., Paul Schlein, D.J. Hand, Ruben Lopez-To
P.A. Haber, J.H. Piedra, D.M. Kessner, M.S. Wolfe, C.H. Oliver, Jr., A
Cady, W.T. Moore, D.A. Morowitz, Guiseppe Balsamo, G.J. Thorpe, A.B
Knudson, N.L. Christopher, R.B.W. Smith, G.H. Coffey, G.H. Nachm
R.A. Fischer, Bernard Grand, R.M. Kaufman, A.L. Ginsburg, M.J. Ste
Phillip Toskes, Cesar Rudzki, R.A. Giannella

Instructors S.H. Mendelson, J.R. Whiteman *(Research)*, Ma. Eleanor Flor
Olga Pruna, Catherine Chura *(Research—Clinical Pharmacology)*, Joan P
tow, Atin Guha, M.S. Maillis, Thada Piamphongsant, R.C. Saunders, A
Thompson, Mustafa Saleem, P.F. Poblete

Clinical Instructors N.K. Bohrer, N.G. Goodman, J.D. Herman, Scheldon Kre
Frederick Meyers, Lily Ruckstuhl, C.U. Shilling, H.O. Schindelar, A
Barrabini, Robert Kramer, F.J. Borsody, Richard Schoenfeld, M.J. Ha
stam, D.W. Datlow, G.G. Kay, R.M. Huffman, Florentino Palmon, N
Conway, L.P. Appel, M.A. Herman, R.O. Knox, R.S. Waldman, K
Turner, C.W. Kinzer, S.A. Schwartz, Andree Thomas, Marvin Schne
Gladys Rosenstein, Herman Rosenstein, Harris Kenner, N.P. Trujillo, J
Magal, G.A. Tralka, L.F. Barker, R.J. Lindeman, D.D. Haut, Isaac Wers
P.R. Lenz, A.J. Anderson, P.G. Rochmis, J.F. Mermel, Richard Hochm
S.H. Schachner, M.M. Shefferman, Paul P.L. Chang, E.J. Chap, I.M. Wo
N.T. Connally, J.C. Perkins, A.M. Mondzac, H.J. Alpert, P.V. Hol
Leo Janis, R.A. McConnaughy, S.R. Rishi, Israel Spector, B.G. Vlad
R.G. Masson, Devanhalli Ramaswamy, Dorothy Millon, K.S. Gimbel, D
Holbrook, D.L. Pearle, Hoyoko Yahanda, Manoochehr Pooya, R.K. S
J.L. Bolen, C.S. Foster, R.B. Freidin, S.R. Kanner, C.C. Lucas, Jr., M
Savin, J.M. Solomon, E.J. Tapper, Lawrence Klein, H.R. Birschbach, Da
Ein, Martin Greenfield, Kenneth Joslyn, Raymond Matta, R.E. Miller, H
Mirsky, L.G. Pawlson, Bryan Arling, M.J. Davidson, J.E. Muller, K
Rand, P.E. Cohart, J.B. Crandall, M.A. Newman, S.N. Richman

Special Lecturers Sol Katz *(Pulmonary Diseases)*, R.W. Berliner *(Rena
eases)*, Albert Sjoerdsma *(Internal Medicine)*, D.S. Fredrickson *(Inte
Medicine)*, T.W. Mattingly *(Cardiology)*, W.C. Roberts *(Cardiology)*, M
Shargel

*305 **Inpatient Clerkship** (15)

Training in comprehensive study of patients; history and physical exa
nation; ward rounds, consultations, conferences, preceptorial teachi
seminars. V.A., D.C. Gen., Univ. hosps., and Wash. Hosp. Ctr.
(12-week periods throughout academic year)

*308 **Outpatient Medicine and Emergency Room** (10)

Care of ambulatory patients and emergency cases under close supervi
Daily clinics in general medicine and various specialties; conferences
current cases. Univ. Clinic and Hosp. Emergency Room
periods throughout the academic year)

* Required for medical students.

311 **Rehabilitation of Teenage Drug Offenders** (1) — LaRosa

Students participate one evening a week in the youth rehabilitation program of the Narcotics Treatment Administration of the District of Columbia. Students encouraged to establish communication with one or two addicts and to investigate in depth factors that led them to addiction. Seminars dealing with various aspects of drug abuse held on alternate Saturday mornings. Limited to 10 students. (Fall)

320 **Experience in Allergy** (10) — Brown

Clinical experience in allergy. 2 seniors; 8-week elective periods. Univ. Clinic (September–May)

323 **Impact of the Inner-city Environment on Asthma** (5 or 10) — Brown

Each student is assigned one or two patients. Under the guidance of an internist or psychiatrist, student takes care of the patient medically and allergically and studies his psychodynamics. With the patient, the student visits the patient's home and family and areas the patient finds stressful (welfare office, food stamp office, court of law, public housing office, Neighborhood Legal Services, etc.) 2 seniors; 4- or 8-week elective periods. Univ. Clinic (September–May)

326 **Research: Allergy** (10) — Brown

Research in clinical or experimental allergy or related field. 1 or 2 seniors; 8-week elective periods. Univ. Clinic (September–May)

331 **Acting Intern in Medicine** (5) — Corn

Each student is assigned to a patient-care ward team and assumes basic responsibility, under supervision of a resident and the attending physician, for the management of approximately six patients. The student functions as an intern (however, all written orders must be countersigned). Participation in case presentation and scheduled conferences. 8 seniors; 4-week elective periods. D.C. Gen. Hosp. (September–May)

334 **Acting Intern in Medicine** (15) — Zimmerman

Student functions as an intern on the general medical wards, under supervision of a rotating resident. With the resident, he is responsible for work-up, diagnosis, and management of patients, and for presenting his patients during attending rounds and house staff conferences. 5 seniors; 12-week elective periods. V.A. Hosp. (September–May)

335 **Inpatient Medicine** (5) — Apter

Participation in diagnostic studies and clinical management of bed patients. Teaching rounds, conferences. 4 seniors; 4-week elective periods. Fairfax Hosp. (September–May)

337 **Inpatient Medicine and Medical Emergencies** (5) — Curtin, Bacos, Mendelson

Assignments to Intensive Care Unit and Emergency Room; ward rounds, conferences, reading assignments. 2 seniors; 4-week elective periods. Wash. Hosp. Center (September–May)

340 **Ambulatory Health Care** (10) — Piemme

Participation in community health program, including the University Clinic, University Hospital Emergency Room, a Home Care Program, and a transportation system. Students are involved in all facets of the program. Each student is expected to study a specific element of the system with respect to its effect on the capacity to deliver health care within

a community. Exchange with similar programs in other universiti possible for students who elect more than the 8-week minimum. ferences, reading assignments. 2 seniors; 8-week elective periods. Hosp. (September–May)

342 **Narcotics Abuse** (10 or 15) LaR

Student is assigned a project in the narcotics treatment program of District of Columbia and works with Dr. LaRosa and Dr. Robert Dup Director of the D.C. Narcotics Treatment Administration (NTA). ects are individualized and may range from intensive experience in NTA therapeutic communities to the evaluation of the impact of mai done maintenance on narcotics abuse in the District of Columbia. 1 ior; 8- or 12-week elective periods. NTA (September–May)

345 **Family Practice Preceptorship** (5) Anders

Preceptorship in small urban community family practice. 1 senior; 4-w elective periods. Waynesboro, Va. (September–May)

352 **Clinical Cardiology** (10) Siu and Sh

Training in clinical cardiology based on the needs and desires of the in vidual student. The following choices are available: inpatient and offi patient care, experience in the Coronary Care Unit, Peripheral Vascu Laboratory, Cardiac Rehabilitation, interpretation of electrocardiogr and vectorcardiograms in the Heart Station (this rotation can also inc experience in graphic techniques such as phonocardiography and ap cardiography), work in the exercise ECG Laboratory, participation hypertensive studies, a period in the Cardiac Catheterization Laborato and whenever possible a study project. 12 seniors; 8-week elective per Univ. Hosp. (September–May)

355 **Clinical Cardiovascular Pathophysiology** (10) Cheng and Sh

Clinical and laboratory evaluation of cardiovascular and related pr monary problems; training in ECG, phonocardiography, cardiac cathet zation, angiocardiography (both cine and serial). 2 seniors; 8-week e tive periods. D.C. Gen. Hosp. (September–May)

358 **Introduction to Cardiology** (5) Bacos, Mendez

Participation in clinical cardiology, correlating the bedside approac cardiovascular diagnosis with special diagnostic studies, including pho cardiography, atrial electrocardiography, cardiac catheterization, ang giocardiography, etc. 1 senior; 4-week elective periods. Wash Ho Center (September–May)

Shugoll

360 **Clinical Cardiology** (5 or 10)

Under supervision, the student is responsible for reading electrocar grams, consulting on cardiovascular problems, and participating various cardiac catheterization and angiographic procedures. Experien cardiac fluoroscopy, introduction to vectorcardiography. Teaching ro three times weekly; two weekly courses, one in auscultation, one in e trocardiography. 2 seniors; 4- or 8-week elective periods. V.A. Hosp (September–May)

Shugoll

363 **Cardiac and Medical Intensive Care** (10)

Student has the opportunity (1) to manage cardiac emergencies,

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* Dr. Anderson is in private practice in Waynesboro, Virginia
† Dr. Shugoll is Chief of Cardiology at the Veterans Administration Hospital

arrhythmias, use cardioversion, and become familiar with all aspects of acute cardiac care; (2) to manage medical emergencies ranging from diabetic ketoacidosis to hypoglycemia, from uremia to hepatic coma; and (3) to receive training in the modern therapy of respiratory failure. Included are the use of mechanical ventilators, oxygen therapy, and management of respiratory acid-base problems. 2 seniors; 8-week elective periods. V.A. Hosp. (September–May)

370 **Endocrinology and Cancer Chemotherapy** (5) L. Alpert

Clinical work; emphasis on endocrinology (and metabolism) or cancer chemotherapy, depending on student's choice. 2 seniors; 4-week elective periods. Univ. Clinic (January 29–March 25)

371 **Endocrinology** (5) Shapiro

Student evaluates patients referred to the Endocrinology Service, takes part in planning diagnostic work-ups or therapy programs, and is responsible for case presentations of patients he has worked up. Exposure to techniques used in the Endocrinology Laboratory, such as protein binding determinations and radio-immuno assay of hormones; participation in Journal Club 4 mornings a week. 1 senior; 4-week elective periods. Wash. Hosp. Center (January 29–May 20)

373 **Endocrinology and Metabolism** (5 to 15) Becker

Clinical experience in endocrinology and metabolism. Students examine endocrine patients, make preliminary diagnoses, and assist in treatment. Clinical rounds twice weekly; weekly endocrine clinic, diabetic clinic, and Journal Club participation; frequent endocrine lectures; laboratory and research experience available. 3 seniors; 4- to 12-week elective periods. V.A. Hosp. (September–May)

376 **Metabolic Disorders in Diabetes** (5) Penhos

Intensive and practical studies of the technique to produce surgical, chemical, and hormonal diabetes. Participation in research on carbohydrate, protein, and lipid metabolism, insulin secretion in isolated organ perfusions. Seminars and participation in Journal Club, and discussions on the results obtained. 4 seniors; 4-week elective periods. V.A. Hosp. (September–May)

381 **Research in Endocrinology** (5) Penhos

Participation in endocrine research, including laboratory experience, experimental surgery, biochemical methods, and *in vivo* and *in vitro* endocrine studies. Weekly seminars and discussions correlate experimental results with clinical observations. 4 seniors; 4-week elective periods. V.A. Hosp. (September–May)

385 **Biochemical Abnormalities in Disorders of Lipoprotein Metabolism** (15) LaRosa

Current research directed toward the biochemical purification of enzymes responsible for removing lipids from the plasma and a study of the possible relationship between induction of these enzymes and the progestional and estrogenic components of currently used birth control pills. Experience in the use of modern techniques of protein separation, including ultracentrifugation, electrophoresis, and chromatography; experience in handling radioactive isotopes. Clinical experience with patients who have hyperlipoproteinemia. 1 senior; 12-week elective periods. Nat'l. Heart and Lung Institute and Univ. Hosp. (September–May)

387 **Diabetes Research Laboratory** (15) Reca

Emphasis on problems in the pathogenesis of diabetes. Experience pancreas and liver perfusion, study of the mechanism of insulin sec tion and the effect of insulin on the liver. Additional studies in hum subjects to investigate portal vein insulin patterns as compared w peripheral insulin levels. Exposure to techniques such as immunoass of hormones and their use in the diagnosis and management of endocri disease. Weekly conferences. 2 seniors; 12-week elective periods. V Hosp. (September–May)

390 **Extramural Internal Medicine Elective** (arr.)

The Department may arrange for selected students to spend electi periods at other institutions. Interested students should contact the Cha man of the Department.

391 **Clinical Oncology** (10) Selaw

Participation in clinical management of patients with carcinoma, inclu ing supportive measures and palliative therapy. 3 seniors; 8-week electi periods. V.A. Hosp. (September–May)

393 **Oncology** (10) DeVi

Experience in current methods in evaluation and treatment of lymphoma and other tumors, including a view of the broad spectrum of these di eases. Participation in patient care and laboratory studies of current re search in clinical pharmacology and tumor kinetics. 2 seniors; 8-week elective periods. NIH (September–May)

394 **Cell Kinetics** (10) Selaw

Study in the Medical Oncology Section on the generation time and divi ing pool of cancer *in vivo* before and during therapy. 1 senior; 8-week elective periods. V.A. Hosp. (September–May)

397 **Clinical Pharmacology of New Antineoplastic Agents** (10) Selawr

Participation in study design, drug administration, day-to-day obser tions, and use of biochemical or other methodology for determination drug uptake, metabolism, and excretion. 1 senior; 8-week elective period V.A. Hosp. (September–May)

399 **Cellular Pharmacology** (10) Selawr

Determination of optimal concentration, time factors, and elucidation antineoplastic agents. 1 senior; 8-week elective periods. V.A. Hosp (September–May)

402 **Research in Cancer Immunology** (10) Hollinshe

Laboratory experience with tests used to correlate cellular anti-tumor re activity to solid tumors with the clinical course of the disease; experi ments to investigate viral etiology of certain forms of cancer. 1 senio 8-week elective periods. Warwick Bldg. (September–May)

407 **Laboratory Studies in Human Respiratory Viruses** (10) Perki

Participation in a research program involving the characterization of new respiratory viruses; study of the role of nasal secretory antibody in upper respiratory disease. 1 senior; 8-week elective periods. NIH (Decem ber–May)

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* Dr. Recant is Chief of the Diabetes Research Laboratory at the Veterans Administration Hospital

411 **Clinical Gastroenterology** (5) **Danovitch**

Experience in clinical gastroenterology; consultations and follow-up of patients. Presentation of patients at conferences; observations and diagnostic procedures, including endoscopy; review of histology of lesions of intestinal tract and liver. 1 senior; 4-week elective periods. Wash. Hosp. Center (September–May)

413 **Clinical Gastroenterology** (5 or 10) **Dobbins**

Intensive clinical experience with patients who have digestive disease, including those of the gastrointestinal tract, liver, and pancreas. Patient consultations, teaching rounds, seminars. Joint conferences with surgery, pathology, and radiology emphasize the multidisciplinary approach in digestive diseases. 2 seniors; 4- or 8-week elective periods. Univ. Clinic (September–May)

414 **Clinical Gastroenterology—Hepatology** (5 or 10) **Finkelstein**

Students see patients referred to the Gastroenterology-Hepatology Section for consultation and are responsible for initial evaluation and the follow-up of these patients. Participation in all specialized procedures performed by the members of the Section. Teaching rounds, conferences, seminars. Student elects to concentrate in either gastroenterology or hepatology. 4 seniors; 4- or 8-week elective periods. V.A. Hosp. (September–May)

417 **Hepatic and Metabolic Diseases** (5) **Ticktin**

Participation in clinical studies of patients with hepatic and pancreatic diseases; endoscopy, splenoportography, liver biopsy, peritoneoscopy. 2 seniors; 4-week elective periods. Univ. Hosp. (September–May)

420 **Clinical Gastroenterology** (5 or 10) **Postow**

Clinical work in gastroenterology, including participation in GI procedures, biopsies, and endoscopies. 1 senior; 4- or 8-week elective periods. D.C. Gen. Hosp. (September–May)

423 **Clinical Gastroenterology** (5) **Trujillo**

Introduction to clinical problems in diagnosis and treatment of gastroenterology in both office and hospital practice. Peritoneoscopy, endoscopy, and biopsies. 1 senior; 4-week elective periods. D.C. and Univ. hosps. (September–May)

424 **Morphology of the Intestines** (10) **Dobbins**

Research designed to acquaint the student with a variety of morphologic techniques used in the study of mucosal disease of the gastrointestinal tract. Includes electron microscopy and light microscopy techniques—phase and fluorescent microscopy. Preference given to student able to continue on a part-time basis following completion of the elective. 1 senior; 8-week elective periods. Univ. Clinic (September–May)

426 **Research in Metabolism of Sulphur Amino Acids** (15) **Finkelstein**

Control of methionine metabolism in mammalian tissues using several research techniques: kinetic properties of purified enzymes; induction and repression of enzymes by hormones and diet; metabolism of methionine in the isolated perfused rat liver. Projects available in any of the above areas and will be developed further to meet student needs. Research seminars at this and other institutions in the Washington area. 1 senior; 12-week elective periods. V.A. Hosp. (September–May)

430 Clinical Hematology (5) McFarl

Under the supervision of members of the staff of the Hematology Se the student will observe patients with hematological problems and learn the techniques of bone marrow aspiration and biopsy. Tri-w rounds, morphology review sessions, participation in weekly clinic Journal Club. 1 senior; 4-week elective periods. V.A. Hosp. tember–May)

431 Clinical Hematology (5 or 10) Lessin, O'L

Participation in the diagnosis and therapy of hematologic disorder cluding inpatient and outpatient hematology consultations, daily care follow-up of clinical hematologic problems. Emphasis on acqua the student with modern hematologic diagnostic procedures and c literature. 2 seniors; 4- or 8-week elective periods. Univ. Hosp Clinic (September–May)

432 Clinical Hematology (5)

Clinical evaluation of inpatients and outpatients with symptoms refer to the myelopoietic system using bedside and laboratory investig parameters. 1 senior; 4-week elective periods. Wash. Hosp. Cente (September–May)

433 Hematology (5) Rhei

Observation of and participation in diagnosis and treatment of pa with hematologic disorders. 1 senior; 4-week elective periods Hosp. (September–May)

435 Hematology Research (10) Lessin, O'L

Participation in the Hematology Research Laboratory. Emphasis o velopment of the student's own project related to dynamic morpho of the blood cells, blood cell ultrastructure, and electron micro techniques. Additional research study in tumor immunology and tion techniques available. Brief research paper required. 3 senio week elective periods. Univ. Hosp. (September–May)

436 Hematology Research (10 or 15) McFar

For students interested in both clinical problems and a research proje hematology. Research of the Hematology Laboratory deals with phocytebiology, in particular lymphocyte blastogenesis and lymphoc macrophage interactions; *in vitro* human and animal lymphocyte cul 1 senior; 8- or 12-week elective periods. V.A. Hosp. (Septe May)

440 Pulmonary Medicine (10 or 15) D. Ma

Introduction to the diagnosis and treatment of diseases of the lung perience in the management of patients with acute respiratory fa Participation in daily ward rounds with a full-time faculty membe in weekly Pulmonary Grand Rounds and the Lung Seminar Series up each week of one new inpatient with tuberculosis and of one new tuberculous inpatient, including appropriate diagnostic and compre monary function testing. 2 seniors; 8- or 12-week elective periods Hosp. (September–May)

442 Pulmonary Diseases (5) Wa

Performance and interpretation of pulmonary function studies, in

* Dr. McFarland is Chief of the Hematology Section at the Veterans Administration Hospital

ventilatory, diffusing capacity, and blood gas analysis; daily teaching rounds and supervised consultation on patients with various pulmonary and infectious diseases. Participation in Pulmonary Clinic; techniques and principles of inhalation therapy. 1 senior; 4-week elective periods. Wash. Hosp. Center (September–May)

447 **Research in Pulmonary Diseases** (15) D. Massaro

Detailed studies of the synthesis and regulation of lung surfactant and the mechanisms of airways obstruction. 3 seniors; 12-week elective periods. V.A. Hosp. (September–May)

451 **Arthritis and Rheumatic Diseases** (5) Felts

Introduction to clinical problems in the diagnosis and treatment of arthritis and rheumatic diseases. Emphasis on patient evaluation and establishment of therapeutic priorities. 2 seniors; 4-week elective periods. Univ. Clinic (September–May)

452 **Clinical Rheumatology** (10) Reefe*

Observation of rheumatology inpatient consultations and participation in the Rheumatology Clinic. Laboratory facilities available with emphasis on synovial fluid analysis. Special diagnostic techniques, such as needle biopsy of the synovial membrane. Differential diagnosis and management of patients with rheumatologic disorders. 1 senior; 8-week elective periods. V.A. Hosp. (September–May)

454 **Total Patient Care** (5) Tamagna

Participation in teamwork for total patient care, including clinical and psychological studies and rehabilitation; group conferences, research. 1 senior; 4-week elective periods. Univ. Clinic (September–May)

460 **Renal and Electrolyte Disorders** (5) Berkman

Participation in consultations on renal and electrolyte abnormalities; follow-up of patients. Examination of the urinary sediment and in peritoneal and hemodialysis. Conferences, reading assignments, ward rounds, participation in Journal Club. Student may participate in a research project during an extended elective period. 1 senior; 4-week elective periods. Wash. Hosp. Center (September–May)

461 **Clinical Renal Disease** (5) Parrish, N. Kramer

Participation in clinical and laboratory procedures used in the study of renal disease. Ward rounds, consultations, conferences, seminars. 2 seniors; 4-week elective periods. D.C. Gen. and Univ. hosps. (September–May)

463 **Clinical Application of Tissue Immunology** (5) N. Kramer

Application of immunologic methods to the study of human hypersensitivity states and metabolic diseases; study of serum proteins, including protein hormones and enzymes; research principles and methods. 1 senior; 4-week elective periods. Univ. Hosp. (September–May)

465 **Renal Diseases and Fluid and Electrolyte Problems** (5 or 10) Jacobson

Participation in office and hospital consultations; care of patients with renal diseases and fluid and electrolyte problems. Student becomes familiar with a variety of renal problems; works up patients with renal disease;

* Reefe is Chief of the Rheumatology Section at the Veterans Administration Hospital.

evaluates renal function studies. Emphasis on critical use of medical l
ture. 1 senior; 4- or 8-week elective periods. (January 29–Ma

469 **Clinical Renal Disease** (5 or 10) Shalh

Broad exposure and active participation in all the clinical activities
Renal Section, including consultations, outpatient clinic, rounds, c
ences, and Journal Club meetings. Instruction in the indication
techniques of acute and chronic hemodialysis and peritoneal dialy
seniors; 4- or 8-week elective periods. V.A. Hosp. (September–

471 **Research in Renal Disease** (10 or 15) Shalh

Standard clearance techniques in man and dog (renal and elec
physiology), metabolic studies on kidney slices, studies on erythrop
secretion. Standard instrumentation and analytical procedures of a
research laboratory, including inulins, PAH, electrolytes, osmolality
pH. 1 senior; 8- or 12-week elective periods. V.A. Hosp. (Se
ber–May)

473 **Research in Mechanisms of Sodium Homeostasis** (15) Keim

Supervised laboratory research on the mechanisms of sodium homeo
in vitro and *in vivo* animal studies using various techniques, incl
isotopic tracer experiments. Readings from relevant physiological
clinical literature. 1 senior; 12-week elective periods. Univ. Hosp
(September–May)

480 **Clinical Hemodynamics** (5 or 10)

Participation in the clinical and research activities of hemodyna
Cardiac, splanchnic, and renal catheterizations. Participation in
in the dog physiology laboratory; experience in the bedside study
management of critically-ill patients and in the hypertensive outp
clinic. 1 senior; 4- or 8-week elective periods. V.A. Hosp. (Se
ber–May)

483 **Nuclear Medicine** (15) Sauerbru

Introduction to radioisotope methodology as applied to diagnos
therapeutic problems in medicine. Study of the unique properti
radioactivity, radiation safety, and instrumental uses in the detecti
radiation. Clinical application of nuclear medicine allows the stude
participate in evaluation of patients referred for diagnostic and t
peutic studies. Assigned readings, daily conferences, laboratory lec
tion. Student may choose a selected field of interest for more inte
study and may engage in limited participation in on-going clinic
search projects. 2 seniors; 12-week elective periods. V.A. Hosp
(September–May)

485 **Effects of Drugs in Man** (5)

Correlation between clinical research at the bedside and laborator
perimentation. Participation in clinical and laboratory follow-up of
tients. Introduction to long-term controlled studies on the effects of
in hypertension with exposure to data retrieval, programming, and
puter analysis. 2 seniors; 4-week elective periods. Wash. Hosp. C
(September–May)

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* Dr. Shalhoub is Chief of the Renal Section at the Veterans Administration Hospital.
† Dr. Cohn is Chief of the Section of Hypertension and Clinical Hemodynamics at the Ve
Administration Hospital.
‡ Dr. Sauerbrunn is Chief of Nuclear Medicine at the Veterans Administration Hospital.

Microbiology

Chairman: R.C. Parlett

Professors Mary Louise Robbins, R.C. Parlett, Rudolph Hugh, M.S. Legator *(Research)*, E.M. Lerner II *(Research)*
Professorial Lecturers F.B. Gordon *(Virology)*, Dorothy Heilman *(Cellular Immunology)*
Associate Professors L.F. Affronti, Melvin Reich, Kun-yen Huang
Assistant Professors G.L. Wright, Jr., Yang-Ming Chu, Rosalie De Giovanni-Donnelly *(Research)*
Assistant Professorial Lecturer P.J. Price

*201 **Medical Microbiology** (6) — Staff

For medical students; open to qualified graduate students. Bacteria, rickettsiae, viruses, yeasts, molds, protozoa, metazoa which relate to the health and disease of man—cultural studies, methods of diagnoses, theories. Laboratory fee for nonmedical students, $16. (Spring)

214 **Tissue Cell Culture and Somatic Variation** (4) — Chu, Price

Techniques of tissue culture and means of studying somatic variations. Prerequisite: Micr 201 or equivalent. (Spring)

219–20 **Scientific Writing for Graduate Students** (1–1) — Robbins

Required of all graduate students prior to writing a thesis or dissertation. (Academic year)

221 **Methods of Scientific Presentation for Graduate Students** (1) — Wright

Photography and graphic arts presentation of research data for publication and scientific meetings. Prerequisite: Micr 219–20. Laboratory fee, $16. (Fall)

223 **Antimicrobial Chemotherapy** (1) — Affronti, Reich

For medical students. Selection, clinical applications, and mechanism of action of various drugs and antibiotics used in the treatment of microbial infections. Prerequisite: Micr 201. (Fall)

225 **Microbial Physiology I** (3) — Affronti, Reich

Morphology and biochemistry of various microorganisms with emphasis on bacteria. Prerequisite: Bioc 201, Micr 201. (Fall)

226 **Microbial Physiology II** (3) — Affronti, Reich

Effects of physical and chemical agents on microorganisms with emphasis on antibiotics. Prerequisite: Micr 225 or permission of instructor. (Spring)

230 **Immunology** (4) — Wright

Fundamental immunologic concepts. Serologic and immunologic procedures as applied to clinical and research situations emphasized. Prerequisite: Micr 201 or permission of instructor. (Fall)

231 **Immunobiology** (1) — Wright and Staff

(Formerly Cellular Immunology)

Study of immunological functions of reticulo-endothelial tissues, theories

*Required for medical students.

of autoimmunity, graft rejection, tumor immunity, delayed hypersens
ties, and immunogenetics. (Fall)

233 **Biology of Viruses** (2) Robbins, Hu

Biochemical and genetic characterization of viruses. Prerequisite:
201 or equivalent. (Fall)

234 **Biology of Viruses—Laboratory** (2) Robbins, Hu

Laboratory complement to Micr 233. Prerequisite or concurrent regi
tion: Micr 233. Laboratory fee for nonmedical students, $16. (F

235 **Systematic Bacteriology** (2) H

History of bacterial classification, international rules of nomenclatur
applied to bacteria, development of bacterial classification based on
tionships, survey of characteristics of bacterial groups. Prerequisite:
201 or equivalent. (1973–74 and alternate years: fall)

251 **Bacteriology** (2) H

Primarily elective course for medical students; open to graduate stud
Clinical situations involving bacteriology; emphasis on the manner
which infectious agents bring about disease processes. Prerequisite:
201 or equivalent. (Fall)

255 **Virology** (2) Huang, Rob

Primarily elective course for medical students; open to graduate stude
General principles of virology; emphasis on clinical situations. Prere
site: Micr 201 or equivalent. (Fall)

257 **Experimental Immunochemistry** (3) Wi

Biochemical and physiochemical characterization of antigens and
bodies. Prerequisite: Bioc 221–22 or equivalent, Micr 230. Labora
fee for nonmedical students, $16. Limited enrollment. (1973–74
alternate years: spring)

258 **Microbial Genetics** (2) De Giovanni-Donnelly, Leg

Survey of microbial systems that depict basic concepts of genetic
ciples. Prerequisite: Micr 201 or equivalent. (Spring) S

277–78 **Seminar: Microbiology** (1–1) Robb

Required of graduate students. (Academic year)

280 **Virology** (10)

Selected problems; library assignments, laboratory studies. 4 senior
week elective periods. School of Medicine (September–May)

281 **Biological Basis of Infections** (5) Affronti, R

(Formerly Bacterial Physiology)

Selected problems; library assignments, laboratory studies, term pa
5 seniors, 4-week elective periods. School of Medicine (Septemb
May)

282 **Immunology** (5) Wright, C

Selected problems, library assignments, laboratory research. 4 stu
4-week elective periods. School of Medicine (September–May)

283 **Bacteriology** (10) — Hugh

Selected problems; library assignments, laboratory studies, term paper. 2 seniors; 8-week elective periods. School of Medicine (September–May)

284 **Microbial Genetics** (5) — De Giovanni-Donnelly

Selected problems, library assignments, laboratory studies, term paper. 3 seniors; 4-week elective periods. School of Medicine (September–May)

285 **Immunologic Characterization of Cell Lines in Tissue Culture** (10) — Chu, Price

Preparation of specific antigens from a cell strain and production of antibodies against this strain in appropriate mammalian host; identification of unknown cell types using tissue culture, serology, immunochemistry. 2 seniors; 8-week elective periods. (September–May)

286 **Diploid Cell Lines in Tissue Culture** (10) — Chu, Price

Mammalian cells growing on glass surfaces in various media, staining chromosomes and determining chromosome pattern and number, methods of cell preservation such as liquid nitrogen freezing. 2 seniors; 8-week elective periods. (September–May)

287 **Transformation of Cells in Tissue Culture** (10) — Chu, Price

Conversion of normal cell lines in tissue culture to heterploid cell lines, demonstration of cancerous nature of transformation by inoculation of hamster cheek pouch. Polyoma virus and SB 40 used with various cell types, including human embryo. 2 seniors; 8-week elective periods. (September–May)

290 **Extramural Microbiology Elective** (arr.)

The Department may arrange for selected medical students to spend elective periods in other institutions. Interested students should contact the Chairman of the Department.

293 **Special Topics in Microbiology** (arr.) — Staff

Selected topics in microbiology. May be repeated for credit. (Fall and spring)

295 **Research in Microbiology** (arr.) — Staff

Content differs each time the course is offered; may be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3) — Staff

(Fall and spring)

398 **Advanced Reading and Research** (arr.) — Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) — Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

Neurological Surgery

Chairman: H.V. Rizzoli

Professor H.V. Rizzoli
Clinical Professors J.M. Williams, H.H. Ammerman, Giovanni Di Chiro,
Hayes
Professorial Lecturer K.M. Earle
Associate Professors J.L. Fox, T.H. Milhorat
Associate Clinical Professors J.P. Murphy, L.G. Kempe, N.H. Horwitz,
Jakoby
Assistant Professor Emanuele Mannarino
Assistant Clinical Professors G.M. Swain, A.P. Hustead, W.M. Hammon
Assistant Professorial Lecturer A.E. Wentz
Instructor C.W. Campbell
Clinical Instructors R.A. Mendelsohn, J.W. Barrett, C.P.H. Carroll,
Cooney, J.A. Gulbrandsen

380 **Clinical Neurosurgery** (5)
Clinical clerkship in neurosurgical service. Emphasis on neurologic
amination; indications for special neurologic tests, e.g., arteriogr
pneumoencephalograms, etc.; and operative procedures. 3 seniors; 4-w
elective periods. Univ. Clinic (September–May)

381 **Clinical Neurosurgery** (5)
Participation in all departmental activities: ward rounds, daily con
ences, radiographic and pathologic studies, operating room procedu
emphasis on studies of cerebral circulation. 2 seniors; 4-week elec
periods. Walter Reed Gen. Hosp. (September–May)

385 **Clinical Neurosurgery** (5)
Clinical clerkship includes experience with diagnostic procedures: arte
grams, pneumoencephalograms, myelograms, and assisting in operat
room; conferences and ward rounds. 1 senior; 4-week elective peri
V.A. Hosp. (January–May)

387 **Clinical Neurosurgery** (5)
Participation in all departmental activities, including ward rounds, c
conferences, radiographic and pathologic studies, and operating room
cedures. 2 seniors; 4-week elective periods. Wash. Hosp. Center
(September–May)

390 **Extramural Neurosurgery Elective** (arr.)
The Department may arrange for selected students to spend elec
periods in other institutions. Interested students should contact the Ch
man of the Department.

Neurology

Chairman: Sean O'Reilly
Director of Encephalographic Laboratory: Harold Stevens

Professors Harold Stevens, Sean O'Reilly, M.J. Malone
Clinical Professors R.H. Groh, W.K. Engel, Franklin Meister
Professorial Lecturers K.M. Earle, N.P. Goldstein
Associate Professor Ann Barnet
Associate Clinical Professors A.S. Dekaban, H.H. Schwamb, Antonio Stazio, Ntinos Myrianthopoulos
Assistant Professors M.N. Ozer, Mary Coleman, J.S. Haller, Karin Nelson, R.B. Weber
Assistant Clinical Professors G.D. Weickhardt, Virginia Duggins, Cosimo Ajmone Marsan, T.W. Kelly, A.D. Huott, Kristof Abraham
Clinical Instructors M.C. Korengold, R.H. Robertson, E.C. Wilner, Miryam Davis, Howard Silby, David Satinsky

380 **Clinical Neurology** (5) — **O'Reilly, Stevens, Weber**

Clinical clerkship in neurology. Emphasis on neurologic examination; indications for special neurologic tests, e.g., arteriograms, pneumoencephalograms, etc. 2 seniors; 4-week elective periods. Univ. Hosp. (September–May)

382 **Pediatric Neurology** (5) — **Malone and Staff**

Clinical clerkship in diagnostic study and care of inpatients and outpatients; conferences and teaching sessions. 2 seniors; 4-week elective periods. Children's Hosp. (September–May)

383 **Clinical Neurology** (5) — **Schwamb**

Emphasis on neurological examination and basic sciences, including neuroanatomy, as applied to clinical material. 2 seniors; 4-week elective periods. Walter Reed Gen. Hosp. (September–May)

386 **Clinical Neurology** (10) — **Goldstein**

Clinical clerkship under close supervision of highly experienced clinicians and teachers. Trainees prepare histories and conduct physicals, attend rounds and conferences, assist in routine procedures. Abundant clinical material available. 2 seniors; 8-week elective periods. Mayo Clinic (September–May)

390 **Extramural Neurology Elective (arr.)**

The Department may arrange for selected students to spend elective periods in other institutions. Interested students should contact the Chairman of the Department.

Obstetrics and Gynecology

Acting Chairman: J.G. Sites

Professors John Parks, R.H. Barter, J.G. Sites
Clinical Professors S.M. Dodek, J.A. Dusbabek, J.K. Cromer, C.K. Fraser
Associate Professors Benny Waxman, Larry McGowan
Associate Clinical Professors W.T. Lady, W.P. McKelway, J.W. Pearson, Jr., Shirley Martin, M.S. Kaufman, M.P. Footer, Donald Walters, J.M. Friedman, B.W. Richwine, Peter Soyster, T.A. Wilson, J.C. Walsh, W.H. Cooper
Assistant Professors C.B. Jacobson, J.L. Marlow

Assistant Clinical Professors Caroline Jackson, J.R. Epstein, S.H. Shea, C Jarvis, N.J. Price, L.M. Liverett, H.P. Treichler, I.W. Rovner, M.W. Sc meyer, Jr., N.M. Tart, R.B. Nelson, Louis Goldstein, George Speck, A Winshel, R.V. Erkenbeck, L.Q. Pugsley, H.L. Kotz, O.I. Dodek, Jr., H Donald, Julius Fogel, A.I. Robins, Muriel Kaiser, S.M. Belinsky, S Stewart, Jr., W.F. Peterson

Instructors L.F. Arias-Bernal, T.L. Jones

Clinical Instructors A.S. Bright, Elizabeth Crisp, E.E. Gahres, D.R. Carls E.E. Cunningham, Geraldine Paul, M.H. Hird, Josiah Sacks, R.E. Badw G.R. Hewlett, E.W. Titus, Jr., T.H. Gresinger, J.M. Close, E.R. Kolvent D.M. Margulies, J.C. Skilling, S.D. Cooley, L.E. Fettig, R.W. Smith, W Wallace, Jr., R.M. Regan, B.A. Band, C.E. Townsend, D.H. Martin, W Perkins, L.C. Radice, J.E. Anderson, A.A. de Moya, C.J. Gueriera, Er Latchis, D.C. Meek, A.A. Becker, C.D. Lord, H.C. Beaver, Carlena Cat bell, Meyer Rosenbaum, A.A. Apicelli, Melchior Savarese, David Davo larian, Robert Resnik

*303 **Clinical Obstetrics and Gynecology** (10)

Participation in all obstetrical and gynecological clinics, daily dep mental conferences and ward rounds at University, Fairfax, and Colum hospitals. Manikin demonstrations of mechanism of labor and vario types of operative delivery. (8-week periods throughout acade year)

351 **Introduction to Clinical Practice** (1) Jacob

Introduction of first-year medical students to patient situations by m bers of the clinical staff. Designed to stimulate questions and disc sions regarding physical, financial, and moral implications of medi practice. 25 students. Univ. Hosp. (Spring)

375 **Family Planning Clinic** (5) Waxm

Participation in instruction and follow-up of patients in a family plan clinic. Use of hormonal and mechanical contraception. 2 seniors. J elective periods. (September–May)

376 **Clinical Obstetrics and Gynecology** (5) Sites, McKelway, Th

Participation in office practice of obstetrics and gynecology. 1 senio week elective periods. (September–May)

377 **Clinical Obstetrics and Gynecology** (5) Coop

Participation in office practice of obstetrics and gynecology. 1 senior week elective periods. (September–May)

378 **Clinical Obstetrics and Gynecology** (5) Pugsley, Cor

Participation in office practice of obstetrics and gynecology. 1 senior week elective periods. (September–May)

379 **Clinical Obstetrics and Gynecology** (5) Footer, Friedm

Participation in office practice of obstetrics and gynecology. 1 senior week elective periods. (September–May)

380 **Gynecologic Oncology** (5) McGo

Participation in the clinical inpatient and outpatient care of women w

* Required for medical students.

gynecologic cancer; related research in the areas of cytology. 2 seniors; 4-week elective periods. Univ. Clinic (September–May)

381 **Clinical Obstetrics and Gynecology** (5) Waxman, McGowan

Participation in office practice of obstetrics and gynecology. 2 seniors; 4-week elective periods. Univ. Clinic (September–May)

382 **Fetal Monitoring in Labor** (5) Waxman

Experience in application of fetal monitoring, accumulation and interpretation of data. Participation in intra-partum study of effects on the fetus of labor position, medication, and types of delivery. 2 seniors; 4-week elective periods. Univ. Clinic (September–May)

383 **Clinical Obstetrics** (5) Nelson, Fraser

Includes prenatal clinics, lying-in periods, delivery and postpartum care; rounds, conferences, seminars. 2 seniors; 4-week elective periods. Wash. Hosp. Center (September–May)

384 **Clinical Gynecology** (5) Cromer, Gahres

Case assignments, rounds and conferences, including tumor board; gynecologic pathology, preparation for surgery, attendance at surgery, postoperative care. 2 seniors; 4-week elective periods. Wash. Hosp. Center (September–May)

385 **Clinical Obstetrics and Gynecology** (5) Price, Treichler

Participation in office practice of obstetrics and gynecology. 1 senior; 4-week elective periods. (September–May)

386 **Inpatient Obstetrics and Gynecology** (5) Patow*

Supervised instruction in large military hospital; rounds and conferences. 4 seniors; 4-week elective periods. Walter Reed Gen. Hosp. (September–May)

387 **Clinical Obstetrics and Gynecology** (5) Cooper, Walters, Jarvis

Participation in patient care; rounds and conferences. 2 seniors; 4-week elective periods. Sibley Memorial Hosp. (September–May)

388 **Clinical Obstetrics and Gynecology** (5) Price

All aspects of inpatient and outpatient obstetrical and gynecologic services; rounds, obstetrical-gynecologic conferences, gynecologic pathology conferences; obstetrical anesthesia; Emergency Room consultations. Home visits to selected patients with Health Department Nurse. 2 seniors; 4-week elective periods. Fairfax Hosp. (September–May)

389 **Clinical Obstetrics and Gynecology** (5) Marlow

Participation in patient care, rounds, and conferences. 2 seniors; 4-week elective periods. Columbia Hosp. (September–May)

390 **Extramural Obstetrics and Gynecology Elective** (arr.)

The Department may arrange for selected students to spend elective periods in other institutions. Interested students should contact the Chairman of the Department.

391 **Cytogenetics** (1) Arias-Bernal

Clinical chromosomal anomalies in man, experimental design and data

* Dr. Patow is Chief of the Obstetrics and Gynecology Service at Walter Reed General Hospital

analysis in cytogenetics, two cytogenetics techniques, sex chromatin sis, tissue culture procedures. Special students admitted with appr instructor. (1972–73 and alternate years: fall)

392 **Reproductive Genetics** (1)

For medical students; open to graduate students with permission structor. Lectures with guest speakers, covering current metho Emphasis on human infertility; clinical case presentation and revi lized whenever possible. Major topics: gametogenesis, *in vivo* manipulation and fertilization, nidation, and selective factors in d ment. 15 2nd-year medical students. Univ. Hosp. (Fall)

395 **Gametogenesis** (1)

For medical students; open to graduate students with permission structor. Seminar course with guest lecturers. Covers various clini experimental factors in gametogenesis. Emphasis on histogenesis gonads, environmental and clinical variables in infertility. 25 students. Univ. Hosp. (Spring)

399 **Medical Genetics** (1)

Clinical examples of genetic disease. Emphasis on basic princip as linkage, heterogenity, mutation, and pedigree inheritance. of the course is to provide the knowledge and skills needed to manage, and counsel common genetic disorders. (1972–73 a nate years: fall)

Ophthalmology

Chairman: M.F. Armaly

Professor M.F. Armaly
Clinical Professors J.H. King, Jr., M.M. Parks, M.G. Alper, L.E. Zim
Associate Professor B.S. Fine *(Research)*
Assistant Professors D.S. Friendly, R.B. Weber, Dertad Manguikian, K
Assistant Clinical Professors W.J. Romejko, W.P. Chalfant, Jr., R.E. Robert Day, J.H. Lodge, W.B. Glew, J.T. Schwartz, K.A. Simo Urweider, B.H. Zeavin, M.O. Ts'o, H.N. Bernstein, D.K. Berler, J.S man, A.L. Fjordbotten, W.S. Gilbert, H.S. Wicker
Instructors Minoru Araki *(Research)*, R.N. Sunga
Clinical Instructors J.R. Weimer, S.S. Pappas, Joanne Economon, R.S H.I. Rodman, George Liss, H.M. McAllister, L.E. Perraut, Victor H.J. Starr, M.H. Zimmerman, Leonard Kogan, J.F. Nowell, Bernard D.L. Lanter, Richard Huberman, P.A. Dorn, Jr., E.M. Zimmerman Snyder, B.S. Bruner, M.E. Lederman, L.E. Rothkoff, M.D. Krinn

281 **Ophthalmic Pathology I** (1)

Basic science aspects of diseases of the eye. (Spring)

282 **Ophthalmic Pathology II** (3)

Diseases of the eye as revealed by gross and microscopic exa 8 students. Armed Forces Inst. of Path. (Spring)

284 **Ophthalmic Pathology III** (5) L. Zimmerman

Daily participation in an active service limited to pathology of the eye and its adnexa. Inflammatory, degenerative, and neoplastic diseases comprise the major categories. 1 senior; 4-week elective periods. Armed Forces Inst. of Path. (Spring)

*302 **Ophthalmology** (OPD) (1) Lodge

Clinical instruction in external examination of the eye; tonometry and funduscopy. Use of ophthalmological instruments. (Fall)

380 **Clinical Ophthalmology** (5) Lodge and Staff

Students will observe all types of eye conditions in ambulatory and hospitalized patients. 3 seniors; 4-week elective periods. Wash. Hosp. Center (September–May)

381 **Clinical Ophthalmology** (5) Armaly

Introduction to clinical ophthalmology, demonstration of the methodology involved in eye examination, detection of normal and abnormal findings, and participation in outpatient and inpatient medical and surgical care. Lectures, seminars. 2 seniors; 4-week elective periods. Univ. Clinic (September–May)

382 **Research in Ophthalmology** (20) Armaly

1 senior; 16-week elective periods. Warwick Bldg. (January 29–May 20)

390 **Extramural Ophthalmology Elective** (arr.)

The Department may arrange for selected students to spend elective periods at other institutions. Interested students should contact the Chairman of the Department.

thopaedic Surgery

rman: J.P. Adams
ciate Chairman: H.L. Feffer

fessors J.P. Adams, H.L. Feffer
cal Professors J.S. Neviaser, L.T. Peterson, Charles Keck
ciate Professors P.I. Kenmore, J.B. Christensen, R.J. Neviaser
ciate Clinical Professors R.L. Dow, Byron Genner III
tant Professor W.P. Fortune
tant Clinical Professors C.W. Metz, Jr., G.J. Schonholtz, G.I. Baker, S.H. Eisenberg, G.P. Bogumill, K.A. Peterson, L.A. Ottenritter, H.S. Cattell, B.P. ...k, C.W. McCutchen *(Biomechanics)*
cal Instructors Ronald Ottenberg, E.L. Radin, A.I. Dobranski *(Anatomy)*, ...nford Lavine, Richard Conant, Ulla Fortune, J.W. Harvey, N.J. Cowen, ...M. Ackerman, N.E. Beisaw, R.J. Heilen, B.P. Gibbons

251 **Trauma—Anatomical, Orthopaedic, and Psychological Aspects** (1) Adams, Christensen

Lecture course for 1st-year medical students taught jointly by members ...ured for medical students.

of the departments of Orthopaedic Surgery, Anatomy, and Psy
(Spring)

*302 **Clinical Clerkship in Orthopaedic Surgery**
2 weeks at the Univ. Hosp.

380 **Orthopaedic Surgery** (5) Adams a
Rotating program: one week of adult orthopaedics at Universi
pital; one week of children's orthopaedics at D.C. General Hos
Children's Hospital; one week of general orthopaedics at Walte
General Hospital, Andrews Air Force Base Hospital, or National
Medical Center. 2 seniors; 4-week elective periods. (Septembe

381 **Orthopaedic Surgery** (5) K
Participation in total care program of orthopaedic patients: daily
conferences, seminars. 2 seniors; 4-week elective periods. V.A
(September–May)

390 **Extramural Orthopaedic Surgery** (arr.)
The Department may arrange for selected students to spend
periods in other institutions. Interested students should contact the
man of the Department.

Otolaryngology

Chairman: J.J. McFarland, Jr.

Associate Clinical Professor J.J. McFarland, Jr.
Assistant Clinical Professors J.L. Levine, M.E. Krucoff, R.S. Page, J
Sabri, W.M. Trible, B.M. Webb, R.E. Pumphrey, Jr.
Clinical Instructors I.S. Jaffee, R.D. Ralph, H.H.E. Scheidemandel, G.
ler, Jr., D.N.F. Fairbanks, Stephen Epstein, R.J. Bobys, Daniel Isaac
Mc

380 **Otolaryngology** (5 or 15)
Care of inpatients and outpatients, diagnosis, and therapy; roun
conferences. 8 seniors; 4- or 12-week elective periods. Wash
Center (September–May)

390 **Extramural Otolaryngology Elective** (arr.)
The Department may arrange for selected students to spend
periods in other institutions. Interested students should contact the
man of the Department.

Pathology

Chairman: T.M. Peery

Professors T.M. Peery, W.R. Duryee (*Research Emeritus—Experimenta*
Miller, Jr., William Newman, J.C. Smith, A.W. Musser, B.H. Sm

* Required for medical students. Credit is a part of and is assigned after completion of Sur

nical Professors L.E. Zimmerman, J.M. Blumberg, E.B. Helwig *(Dermatologic)*, G.H. Reifenstein, N.S. Irey, Robert Sauer *(Comparative)*, Cornelia Hoch-Ligeti

ressorial Lecturers Mary Matthews, P.D. Olch *(History of Medicine)*

sociate Professors W.L. Marsh, Lois Platt *(Cytology)*, Alexander Breslow, F.S. Jannotta, L.S. Lessin *(Hematology)*, M.S. Platt *(Child Health and Development)*

sociate Clinical Professors V.E. Martens, R.E. Palmer, W.J. Jaffurs, M.A. Weinberger

sistant Professors S.G. Kent, Suzanne Hammersberg *(Medical Technology)*, H.C. Zook *(Comparative)*

sistant Clinical Professors W.F. Enos, Marjorie Williams, C.B. Cook, D.R. Parkinson, I.D. Godwin, Floris Garner *(Comparative)*, Gloria Brennan

rtial Lecturer L.C. Johnson

Medical Technology Course.—The Medical Technology Course consists of 12 nths of didactic and practical work in clinical laboratory procedures, offered by Department of Pathology in the University Hospital. Enrollment in the Medical chnology Course is strictly limited so that personal instruction can be given. Stu- ts ordinarily begin this course with the fall semester, but under exceptional cir- ces may begin at other times.

Upon satisfactory completion of the course a certificate is awarded, and the can- date is eligible for the national certifying examination given by the Registry of dical Technologists.

15–16 **Introduction to Medical Science** (1–1) Marsh, Hammersberg, and Staff

Lectures on physiology, pathology, and medicine to accompany Path 119–20. For medical technology students only. (Academic year—1 hour a week)

17–18 **Principles in Medical Technology** (4–4) Marsh, Hammersberg, and Staff

Theories, principles, sources of error of methods used in clinical chemistry, clinical bacteriology, serology, hematology, clinical microscopy. For medical technology students only. (Academic year—4 hours a week)

19–20 **Medical Technology Laboratory** (10–10) Marsh, Hammersberg, and Staff

Rotation through University Hospital pathology laboratories: hematology and urinalysis. 12 weeks; chemistry, 16 weeks; bacteriology and parasitology, 12 weeks; blood bank, 6 weeks; serology, 4 weeks. For medical technology students only. (35 hours a week for 50 weeks)

201 **Pathology** (8) Staff

A general introduction to concepts of disease. Pathology of organ systems; correlation with symptoms and physical signs. Gross and microscopic study of diseased tissues. Case studies. (Fall—12 hours a week)

202 **Diagnostic Conferences** (1) J.C. Smith, Gusack

Case studies demonstrating pathologic significance of major clinical symptoms and physical signs. (Spring—1 hour a week)

ed for medical students.
limited number of graduate students, with permission

*205 **Comparative Pathology I** (3)

An introduction to the study of disease in vertebrates, and com with disease in man. Mechanisms by which various agents prov ness; body defensive reactions. Illustration of common diseases ous species, including material from captive wild animals. Recomm courses in anatomy, histology, and physiology. (Fall—evening)

252 **Forensic Pathology and Medical Jurisprudence** (1)

Somatic death, coroner and medical examiner systems, pathol physical and chemical injuries, medical licensure; the physician- relationship and professional liability are discussed. (Spring— a week)

253 **Medicine in Shakespeare** (1)

Seminars with student and staff presentations covering the plays liam Shakespeare of medical significance. (Spring—1 hour a

254 **Medicine in Literature** (1)

Series of discussions with student and staff presentations covering dramas, nonfiction, and poetry of medical significance. (Fall— a week)

260 **Obstetric and Gynecologic Pathology** (1)

Organ changes in normal and abnormal pregnancy, including mother and the fetus. Diseases of female genital system. (Sp 1 hour a week)

†262 **Problems in Experimental Cellular Pathology** (1)

Cytological and biochemical aspects of cellular function in rela normal and selected pathological conditions. (Spring—1 hour a

Sauer

†266 **Comparative Pathology II** (1)

Participation in an autopsy service involving wild animals in c and comparison of diseases in various animal species with those i Limited to 4 students. Path. Lab., Nat'l. Zoological Park (Fall 3-hour sessions)

†271 **Tissue Reactions to Drugs** (1)

Study of the problems involved in recognizing instances of untow action to therapy. Case presentations. (Spring—1 hour a week

Reife

272 **Pathology in Medicine and Surgery** (2)

Survey of current literature, with application of pathology to medicine and surgery. Each student assigned an article a week, for written report, and group critique. (Spring—2 hours a week)

274 **Medical Pathology** (2)

Study of cases from the necropsy service at University Hospital, ing and interpreting gross and microscopic tissue changes and corr them with clinical data. (Spring—2 hours a week)

Peery and

†276 **Seminars in Pathology** (2)

Conferences on current topics in pathology, conducted by and for residents in pathology. Each student teams up with a resident

* An interdepartmental course offered by the departments of Pathology and Biological Scien
† Open to limited number of graduate students, with permission.

pare and present a seminar on a selected topic. Univ. Hosp. (Spring —2 hours a week)

279 **Ophthalmic Pathology I** (1) Zimmerman

Basic science aspects of diseases of the eye. (Spring—1 hour a week)

280 **Surgical Pathology I** (4) Newman

Surgical pathology service at University Hospital and Washington Hospital Center. Examining specimens from current surgical cases, correlating with clinical manifestations. Univ. Hosp. and Wash. Hosp. Center (Spring—6 hours a week)

282 **Ophthalmic Pathology II** (3) Zimmerman

Diseases of the eye as revealed by gross and microscopic examination. Concurrent registration for Path 279 required. 6 students. Armed Forces Inst. of Path. (Spring—4 hours a week)

*283 **Anatomical Pathology Clerkship** (arr.) Staff

Necropsy and surgical pathology service. Prerequisite: Path 201. Graduate students receive 5 semester hours of credit for each 4-week period and may receive up to 30 semester hours of credit for 6 months full time. Medical students receive 5 semester hours of credit for each 4-week elective period. (Medical students: 3 seniors; 4- or 8-week elective periods; September–May. Graduate students: fall or spring.)

284 **Ophthalmic Pathology III** (5) Zimmerman

Daily participation in service limited to pathology of the eye and its adnexa. 1 senior; 4-week elective periods. Armed Forces Inst. of Path. (September–May)

285 **Clinical Pathology** (5) Martens

Selected techniques of clinical chemistry, hematology, bacteriology. Student selects laboratory problem. 4 seniors; 4-week elective period. Wash. Hosp. Center (January 29–March 25)

286 **Perinatal Pathology** (5) Kent

Participation in perinatal (fetal and newborn) necropsies. Study of selected teaching cases. Examination of selected placentas for disease. 1 senior; 4-week elective periods. Univ. Hosp. (September–May)

287 **Clinical Pathology** (5) Marsh, Kent

Techniques in the clinical laboratory and interpretation of results, follow-up studies. 1 senior; 4-week elective periods. Univ. Hosp. (September–May)

288 **Clinical Cytology** (5) L. Platt

Evaluation of cytologic smears, chiefly vaginal, as a screening procedure in cancer diagnosis. 1 senior; 4-week elective periods. Cytology Lab. (September–May)

289 **Clinical and Anatomical Pathology** (5) Cook

Daily studies of surgical and necropsy pathology, including forensic pathology; clinical pathology projects, including hematology, isotopology, bacteriology. 1 senior; 4-week elective periods. Fairfax Hosp. (September–May)

*Open to limited number of graduate students, with permission.

290 **Extramural Pathology Elective** (arr.),

The Department may arrange for selected medical students to spen
tive periods at other institutions. Interested students should cont
Chairman of the Department.

291 **Clinical and/or Anatomical Pathology** (5) B.

Students will have an opportunity to explore in depth a topic of
to them in the field of pathology; library study. 2 seniors; 4-wee
tive periods. V.A. Hosp. (September–May)

292 **Experimental Pathology: Effect of Cancer on Tissue Composition** (5) Hoch

Participation in studies on the effect of cancer on the distributio
concentration of enzymes and other cellular components in the tis
humans and experimental animals. Spectrophotometric, colori
electrophoretic, histochemical, and histological techniques; limite
ticipation in routine studies in pathology. Room and board fur
2 seniors; 4-week elective periods. V.A. Center, Martinsburg, W.V.
(February 26–April 22)

293 **Clinical and Anatomical Pathology** (5) F

Participation in departmental activities, including clinical chemistry,
bank, microbiology, and hematology; surgical pathology; autop
thology, including medico-legal autopsies. 1 senior; 4-week elect
riods. Alexandria Hosp. (September–May)

295 **Comparative Pathology III** (5) Garner, Zook,

Participation in veterinary pathology service, including wild and do
animals. Prerequisite: Path 201, 283. Graduate students receive 5
ter hours of credit for each 4-week period and may receive up
semester hours of credit for 6 months full time. Medical students r
5 semester hours of credit for each 4-week elective period.
students: 3 seniors; 4-week elective periods. Path. Lab., Nat'l. Zoo
Park, and Armed Forces Inst. of Path. September–May. Graduate
dents: fall or spring.)

296 **Surgical Pathology II** (5) New

Evaluation of surgical specimens and correlation with clinical stu
patient, description of gross and microscopic findings on assigned
2 seniors; 4-week elective periods. Univ. Hosp. (September–M

297 **Dermal Pathology** (5) H

Microscopic conferences, review of current material and study
seniors; 4-week elective periods. Armed Forces Inst. of Path.
tember–May)

298 **Necropsy Pathology** (5) Jannotta, Bo

Organ changes in disease, gross and microscopic examinations, pre
tion of protocols. 2 seniors; 4-week elective periods. Univ. Hosp
(September–May)

299–300 **Thesis Research** (3–3)

(Fall and spring)

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy gener
amination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) **Staff**

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

rmacology

rman: H.G. Mandel

fessors H.G. Mandel, V.H. Cohn, Jr., Paul Mazel, S.E. Fabro *(Research)*
ensorial Lecturers B.B. Brodie, F.E. Hahn
ciate Professors K.S. Kim *(Research)*, W.R. Jondorf *(Research)*, J.A. Straw
tant Professors Philip Klubes, Barbara Roth-Schechter
rial Lecturer D.J. Boullin

*201 **Pharmacology** (8) **Mandel and Staff**

Lectures, laboratory, conferences on interaction of drugs and biological systems as a basis for rational therapy of disease. Prerequisite: biochemistry and physiology, or approval of Department. (Fall)

203 **Fundamental Principles of Pharmacology** (2) **Staff**

Basic principles of pharmacology, including drug-receptor interactions, structure activity relationships, pharmacokinetics, membrane phenomena, cellular control mechanisms, drug toxicity. (Fall)

215 **Adolescent Drug Abuse: a Program for Educators** (3) Cohn and Staff

Offered off campus through the College of General Studies. Primarily for school teachers, counselors, and administrators. Multidisciplinary lectures and discussions concerning the physiological and psychological effects of narcotics, central nervous system stimulants and depressants, alcohol, and hallucinogenic and psychedelic drugs; psychosocial factors leading to adolescent drug abuse; legal implications of drug abuse; prevention, control, and treatment of drug abuse. (Fall and spring)

252 **Seminar: Clinical Pharmacology** (2) **Fabro**

Problems in therapeutics; emphasis on drugs used in treatment of cardiovascular and infectious diseases. Enrollment limited. (1973–74 and alternate years: spring)

254 **Frontiers in Pharmacology** (1) Mandel and Staff

For medical and graduate students. Recent advances and fields of research in pharmacology. Presentations by laboratory scientists from neighboring institutions. (Spring)

256 **Molecular Pharmacology** (2) **Hahn**

For medical and graduate students. Current theory on action of drugs, especially chemotherapeutic agents, at molecular level. Effect of drugs on biosynthetic processes of the cell with respect to DNA, messenger RNA, transfer RNA, ribosomes, protein, cell wall, and intermediary metabolites. Factors which alter action of drugs, such as drug interactions and resistance. (Spring)

*ained for medical students; open to graduate students.

258 **Cancer Chemotherapy** (1) Mandel an

For medical and graduate students. Mechanisms by which drugs the growth of tumor cells. (1973–74 and alternate years: sprin

259 **Developmental Pharmacology** (1)

For medical and graduate students. Lectures, seminars, conference togenic actions of drugs; pharmacological principles which apply prenatal and perinatal development. (1973–74 and alternate spring)

260 **Endocrine Pharmacology** (1)

For medical and graduate students. Lectures and seminars on rec vances in the pharmacology and mechanism of action of variou mones. (1972–73 and alternate years: spring)

267 **Pharmacological Research** (arr.)

For graduate students. Research with staff members. May be re once for credit toward a Master of Science degree. (Fall and

269 **Pharmacology Seminar** (1)

For graduate students. Recent advances in pharmacology. Content each time the course is offered; may be repeated once for credit. and spring)

272 **Physiological Disposition of Drugs** (3)

For medical and graduate students. Fate of drugs in biological Absorption, distribution, chemical alteration, excretion of drugs. ph chemical, and biological factors affecting these processes. Limited students. Prerequisite: Phar 201. (1973–74 and alternate spring)

275–76 **Advanced Topics in Pharmacology I–II** (1–1)

Lectures and seminars on advances in mechanisms of drug action macology of new drugs, theoretical aspects of pharmacology, labo techniques. (1973–74 and alternate years: academic year)

277–78 **Advanced Topics in Pharmacology III–IV** (1–1)

Continuation of Phar 275–76. (1972–73 and alternate years: aca year)

279 **Special Topics in Pharmacology** (arr.)

Selected aspects of drug action. Content differs each time the co offered; may be repeated once for credit. (Fall and spring)

Mazz

281 **Physiological Techniques in Pharmacology—Lecture** (2)

For medical and graduate students. Physiological techniques for st ing information on mechanism and site of action of pharmacol agents. Limited to 20 students. Phar 281 may be taken withou Prerequisite: Phar 201. (1973–74 and alternate years: spring)

Mazz

282 **Physiological Techniques in Pharmacology—Laboratory** (2)

Accompanies Phar 281. Prerequisite: Phar 201. Prerequisite or co rent registration: Phar 281. (1973–74 and alternate years: spring

283 **Biochemical Techniques in Pharmacology** (arr.) Cohn

For graduate students. Lectures and laboratory. Theory and practice of modern biochemical techniques applicable to study of metabolic fate and mechanism of action of drugs. Prerequisite: Phar 201. (As arranged)

285 **Readings in Pharmacology** (1) Staff

For medical students. Assigned reading and preparation of report. (Fall and spring)

286 **Research in Pharmacology** (arr.) Staff

For medical students. Participation in experimental studies in pharmacology, particularly bacterial chemotherapy, cancer chemotherapy, or drug metabolism. (Fall and spring)

295 **Reading and Research** (arr.) Staff

Independent study for students preparing for the Master of Science degree. May be repeated for credit. (Fall and spring)

[illegible]-300 **Thesis Research** (3–3) Staff

(Fall and spring)

398 **Advanced Reading and Research** (arr.) Staff

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.) Staff

Limited to Doctor of Philosophy candidates. May be repeated for credit. (Fall and spring)

[illegible]ysiology

[illegible]ing *Chairman:* R.A. Kenney

[illegible]essors C.S. Tidball, R.A. Kenney, Elizabeth Tidball
[illegible]*fessorial Lecturer* Leonard Laster
[illegible]*ociate Professors* Marie Cassidy, M.J. Jackson
[illegible]*tant Professors* R.A. Lavine, D.W. Watkins
[illegible]*cial Lecturer* L.L. Langley

[illegible]partmental **prerequisite:** Phyl 201 or equivalent is prerequisite to all courses in [illegible]ysiology numbered above 201.

191 **Selected Topics in Human Structure and Function** (3) Kenney

Lecture (2 hours), laboratory (1 hour). Structural and functional basis of physiology. A required course for graduate students who have not had Anat 201 or equivalent. An undergraduate course; students may receive graduate credit on completion of additional work as prescribed by the instructor. Prerequisite: B Sc 11–12 or equivalent and consent of instructor. Open to Columbian College of Arts and Sciences students with the approval of the student's major adviser. (Fall)

*201 **Physiology** (8) Staff

Lecture (8 hours), laboratory (2 hours), conference (1 hour). Cellular,

*Required for medical students; open to graduate students.

organ system, and applied mammalian physiology. Prerequisite f
uate students: Anat 201 or Phyl 191, or equivalent; Bioc 201 or
(Bioc 222 may be taken concurrently); or consent of Chairman
partment. Open to Consortium students only with permission of
ment Chairman. (Spring)

221 **Seminar** (1)

Staff and student presentations from literature. Present work d
experimental design and scientific deduction evaluated. Topics to
nounced. Prerequisite: a reading knowledge of French or Germa
tent differs each time the course is offered; may be repeated fo
(Fall and spring)

251 **History of Medicine** (1) E

Survey of the great contributors to physiology and medicine in
text of the times in which they lived and worked. (Fall)

252 **Physiological Basis of Sexuality** (2) C. Tidball, E.

Conference and discussion on topics including communication,
sexual development, physiological responses, homosexuality, po
control and family planning, fertility and sterility, and other to
interest to the class. (Fall)

253 **Clinical Applications of Physiology** (2) C.

Emphasis on acid-base and fluid-balance physiology and its rela
clinical problems.

261 **Gastrointestinal Physiology** (2)

Lecture or conference 2 hours a week. Physiological approach
clinical problems as peptic ulcer, malabsorption, ulcerative colitis
titis, and others. (Fall)

262 **Cardiovascular Physiology** (2)

Lecture or conference 2 hours a week. Overview of cardiovascular
ology at an advanced level.

264 **Basic Science in Clinical Medicine** (2)

Conferences on basic and clinical research which have brought new
standing to disease states characterized by inborn errors of meta
(Fall)

265 **Review of Endocrinology** (1)

Review of basic endocrinology. (Fall)

266 **Advanced Endocrinology** (2)

Review at advanced level of selected topics in endocrinology and
bolism. Concurrent registration in Phyl 265 required. (Fall)

267 **Renal Physiology** (2)

Lecture or conference 2 hours a week. Overview of renal physiol
advanced level. C.

268 **Computer Utilization in Physiology and Medicine** (2)

Lecture 1 hour a week, practical experience at student's conv
Orientation to digital and analog mini-computers. Programming
eral languages. Experience with one or more computers No
computer experience necessary. (Fall)

269 **Neurophysiology and Control Mechanisms** (2) Lavine

Selected topics in contemporary neurophysiology, including methods of data collection and analysis, control mechanisms involved in movement and behavior and sensory processing. Open to students in the School of Engineering and Applied Science with permission of instructor. (Fall)

270 **Electron Microscopy in Cellular Physiology** (1) Cassidy

Introduction to the applications of electron miscroscopy in the investigation of cellular physiology. (Fall)

273 **Investigative Electron Microscopy** (3) Cassidy

Lecture (2 hours), laboratory as arranged. Application of electron microscopy to biological investigative studies. Limited enrollment. Prerequisite: Anat 261 or equivalent. Admission by permission of instructor. (Fall)

281 **Experimental Gastrointestinal Physiology** (5) C. Tidball

2 seniors; 4-week elective periods. School of Medicine (September–May)

282 **Experimental Cellular Physiology** (5) Cassidy

2 seniors; 4-week elective periods. School of Medicine (September–May)

283 **Experimental Neuroendocrinology** (5) E. Tidball

2 seniors; 4-week elective periods. School of Medicine (September–May)

284 **Amphibian Epithelial Transport** (5 or 10) Watkins

2 seniors; 4- or 8-week elective periods. School of Medicine (September–May)

286 **Experimental Renal Physiology** (5) Kenney

2 seniors; 4-week elective periods. School of Medicine (September–May)

287 **Experimental Electron Microscopy** (5 or 10) Cassidy

2 seniors; 4- or 8-week elective periods. School of Medicine (September–May)

289 **Experimental Nutrition and Metabolism** (5) Jackson

2 seniors; 4-week elective periods. School of Medicine (September–May)

290 **Extramural Physiology Elective** (arr.)

The Department may arrange for selected medical students to spend elective periods at other institutions. Interested students should contact the Chairman of the Department.

291 **Experimental Neurophysiology** (5) Lavine

2 seniors; 4-week elective periods. School of Medicine (September–May)

295 **Research** (arr.) Staff

By special arrangement with individual Staff members. Approximately 4 clock hours in the laboratory for each semester hour of credit. Content

differs each time course is offered; may be repeated for credit. and spring)

298 **Comprehensive Physiology** (2)
Guided review of selected areas of Physiology appropriate to the graduate program. This course satisfies the requirements for the Comprehensive Examination, the Field Examination for doctoral minoring in Physiology, and Part I of the Cumulative General tion. Prerequisite or concurrent registration: Phyl 221. (Fa

299–300 **Thesis Research** (3–3)
(Fall and spring)

396 **Advanced Reading and Research** (2)
Limited to students preparing for the Doctor of Philosophy amination. Tutorial literature survey of a subfield of Physiolog pertinent areas of the candidate's minor field. This course sa requirement for Part II of the Cumulative General Examination iology. (Fall and spring)

398 **Development of Dissertation Problem** (2)
Limited to students preparing for the Doctor of Philosophy amination. Preparation for written and oral presentation of di problem. This course satisfies the requirement for Part III of th lative General Examination in Physiology. (Fall and spring)

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated f (Fall and spring)

Psychiatry

Acting Chairman: J.E. Rankin

Professors Leon Yochelson, J.E. Rankin, R.S. Lourie
Clinical Professors D.C. Cameron, T.D. Noble, Sidney Berman, Morri erman, M. deG. Ruffin, Norman Taub, Samuel Yochelson *(Crim havior)*, D.L. Bazelon *(Socio-legal Aspects)*, Leon Ferber, Paul G Chodoff, H.A. Meyersburg, F.N. Waldrop, Stanley Yolles, Harold *(Experimental Psychology)*, G.C. Salmoiraghi *(Neurophysiology an pharmacology)*, Harvey Resnik, S.N. Kieffer, Leopold Bellak, Brown
Professorial Lecturers W.E. Barton, H.D. Lederer
Associate Professor H.M. Grigorian
Associate Clinical Professors H.P. Laughlin, M.L. Adland, Anna Kaiser, C.T. Bever, David Eden, S.I. Szara *(Psychopharmacology)* Weil-Malherbe *(Neurochemistry)*, J.G. Rubin, E.S. Fleming, R.M W.D. Kehne, A.M. Drummond, J.L. Sheridan, E.I. Kushner, J.H Jack Durell, John Kafka, H.B. Lehrman, I.H. Marill, T.D. Rey *perimental)*, P.S. Weisberg, C.J. Frederick *(Medical Psychology)*, inson, A.S. Abraham, Joseph Baker, Angelo D'Agostino, W.J Roger Peele

tant Professors R.M. Coleman, S.H. Lipsius
tant Clinical Professors Sarah Tenenblatt, R.A. Rogers, J.A. Farrell, N.C. ntz, F.G. Hilkert, I.D. Milowe, W.C. Johnson, R.A. Frank, Leslie Schaffer, H. Kiracofe, Jr., T.M. Mackenzie, R.N. Butler, J.H. Menetrez, Christine ehne, M.A. Woodbury, W.H. Young, Jr., J.H. Bouma, B.L. Burris, Spencer rdon, Jr., C.C.H. Cullander, D.A. Lanham, J.T. Quattlebaum, W.L. Tay- *(Experimental Psychology)*, D.L. Tippett, Archibald Ward, Jr., *(Soci-* ogy), W.G. Tompkins, Frances Thomas *(Social Work)*, S.L. Auster, Ger- de Cotts, Brian Crowley, Margaret Garrett, H.A. Greenberg, H.A. Hoff- an, R.A. McElroy, B.P. McKaig, J.M. Post, William Davidson, J.A. hoettler, Stephen Weissman, Pearl Holly, J.L. Evans, D.D. Cowell, Larry zmang, Barton Pakull, C.R. Gray, M.J. Chalick, Geraldine Schaeffer, T. Lewit, A.M. Messore, W.F. Weber, R.W. Wadeson, Jr., M.T. Advani, R. Haas, Edward Black, J.H.L. Marshall, D.H. Fram, Robert DuPont, t., Andrea Doman *(Psychology)*, M.J. Stern
ructor Ruth Richmond *(Social Work)*
cal Instructors W.H. Dobbs, W.A. Hamman, G.D. Legler, D.G. Lipman, A. Savitz, J.W. Voell, W.J. Polk, R.A. Blum, S.E. Samenow *(Psychology)*
tal Lecturers Julius Hoffman, J.T. English

*252 **Development of the Person** (1) Staff

For 1st-year students. Basic presentation of normal personality development. (Spring)

*253 **Psychopathology** (1) Staff

For 2nd-year students. Fundamentals of maladaptive development. Mental retardation, unconscious mental mechanisms, psychosomatic disorders, and basic psychopathology of depression and schizophrenia. (Fall)

*302 **Clinical Clerkship** (5) Rankin, Grigorian, Cowell, and Staff

Supervised examination, diagnosis, treatment of outpatients and inpatients at University and St. Elizabeths hospitals; case conferences, seminars on psychiatric referral, "psychiatric" drugs, community resources. Psychiatry in general practice stressed. (Fall and spring)

350 **Basic Psychopathology and Psychodynamics** (2) Staff

A seminar format using reading materials and clinical demonstrations to explore the basis of mental illness. Limited to 25 2nd-year students. (Fall)

351 **The Role and Professional Identity of the Physician** (1) Grigorian, D'Agostino

The class explores the personal and social factors of the role of the physician—the aspect of care, identity—through discussion conducted along group dynamic lines. Limited to 20 2nd-year students. (Fall and spring)

352 **Common Personality Configurations** (1) Polk

Selected commercial movies, viewed both during class and in student's free time, provide material illustrative of personality configurations and life styles to be analyzed in group discussions. Limited to 12 2nd-year students. (Fall)

*Required for medical students.

382 **Clinical Psychiatry** (5)

Clinical care of patients hospitalized for emotional and mental
ances. 2 seniors; 4-week elective periods. St. Elizabeths Hosp.
tember–May)

383 **Psychiatric Day Care** (10)

Participation in the evaluation of patients referred for day care an
various activities and programs in the day care center. Research
ing to the day care center in its role in the treatment of psychi
tients. 2 seniors; 8-week elective periods. Psychiatric Inst. of Wa
(September–May)

384 **Geriatric Psychiatry** (5)

Care and rehabilitative efforts with elderly inpatients with psychia
other incapacities. 1 senior; 4-week elective periods. St. Elizabeth
(September–May)

385 **Schizophrenic Reactions** (5)

Psychotherapy and ward management of schizophrenic patients.
4-week elective periods. Chestnut Lodge, Rockville, Md. (Sept
May)

386 **Psychiatric Research** (5)

Research programs involving clinical and experimental investigati
human behavior. 2 seniors; 4-week elective periods. St. Elizabeths
(September–May)

387 **Clinical Psychiatry** (5)

Care of inpatients and outpatients; diagnostic evaluations; individu
group psychotherapies, somatic therapies. 1 senior; 4-week elect
riods. Univ. Hosp. (September–May)

388 **Research: Chronic Patient** (10)

Research into social, anthropological, psychological factors influ
long-term care of patients with chronic diseases. 2 seniors; 8-week
tive periods. Univ. Hosp. (September–May)

389 **Day Hospitalization** (5–15)

Participation in the diagnostic and treatment programs of a separa
independent day hospital designed to prevent and replace full-tim
chiatric hospitalization. Research in the area of partial hospitalizat
senior; one to three 4-week elective periods. Potomac Foundati
Mental Health. (September–May)

390 **Extramural Psychiatry Elective** (arr.)

The Department may arrange for selected students to spend e
periods at other institutions. Interested students should conta
Chairman of the Department.

391 **Research: Constitutional Psychiatry** (10)

Somatotypy, genetics, encephalography, sensory deprivation; emphas
the criminal. 2 seniors; 8-week elective periods. St. Elizabeths Hosp
(September–May)

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* Dr. Bullard is Senior Consultant at Chestnut Lodge

392 **Administrative Psychiatry** (5) Robinson
Apprenticeship to administrator of large public mental hospital. 1 senior; 4-week elective periods. St. Elizabeths Hosp. (September–May)

393 **Research: Psychiatric Aspects of Criminal Behavior** (5) S. Yochelson
Social, anthropological, psychological factors producing criminal behavior. 2 seniors; 4-week elective periods. St. Elizabeths Hosp. (September–May)

adiology

airman: S.D. Rockoff

rofessor S.D. Rockoff
linical Professor A.C. Wyman
rofessorial Lecturer J.M. LoPresti *(Child Health and Development)*
ssociate Professors C.F. Murphy, W.J. Nelson
ssociate Clinical Professors H.J. Kicherer, John Maier, R.M. Caulk, D.B. Sodee *(Nuclear Medicine)*, H.M. Hagen
ssistant Professors V.K. Saini, Massoud Majd-Ardekani, S.J. Kurzbard, Sana Last, D.H. Knudson, Theodore Villafaña
ssistant Clinical Professors Charlotte Donlan, S.R. Bersack, H.L. Berman, Bela Gondos, J.B. Johnston, Jr. *(Radiobiology)*, Marion Faris, Zeki Erim, G.A. Solack, A.S. Cigtay, G.J. Augustin
nstructor May Lesar
linical Instructors George Tievsky, U.V. Wilcox II, C.M. Weber, M.A. Thomas, James Burwell, R.D. Cornell

383 **Clinical Radiology** (5) Wyman and Staff
Radiologic and differential diagnosis; emphasis on the role of diagnostic radiology in clinical problem-solving. Each student is assigned a patient population and correlates the radiologic examinations with the clinical manifestations of disease. The student prepares a brief clinical and radiological summary and participates in procedures, case conferences with staff members, and interaction with medical and surgical staff members. Daily lectures and staff conferences. 5 seniors; 4-week elective periods. Univ. Hosp. (September–May)

384 **Diagnostic Radiology** (5) Burwell and Staff
Participation in general radiography, fluoroscopy, and special procedures. Interpretation of radiologic procedures with staff. Review and study of teaching film file. Attendance at medical, surgical, and pediatric staff conferences. 2 seniors; 4-week elective periods. Fairfax Hosp. (September–May)

385 **Nuclear Medicine** (5) Murphy and Staff
Introduction to the physics of radioisotopes, radiochemistry, radiation detection, and instrumentation. Theory and operation of the nuclear camera and scanner. Study of organ imaging techniques, by lectures, conferences, and participation in patient care. Introduction to radio-immune assay. Correlation between clinical problems and nuclear diagnosis. 1 senior; 4-week elective periods. Univ. Hosp. and Wash. Hosp. Center (September–May)

386 **Radiation Therapy** (5) Nelson an

Introduction to radiotherapeutic techniques, physics of high-energy tion and instrumentation. Radiation treatment and correlated mana of malignant diseases; emphasis on decision-making in a clinical p 1 senior; 4-week elective periods. Univ. Hosp. (September–Ma

390 **Extramural Radiology Elective** (arr.)

The Department may arrange for selected students to spend periods at other institutions. Interested students should contact the man of the Department.

Surgery

Chairman: P.C. Adkins
Chairman of Divisions: P.C. Adkins *(General Surgery and Thoracic and diovascular Surgery)*
Directors of Divisions: S.G. Mead *(Oral Surgery)*, J.G. Randolph *(Pedi Surgery)*, G.S. Letterman *(Plastic Surgery)*

Professors Brian Blades, C.T. Klopp *(Cancer)*, G.S. Letterman *(Plastic)*, Adkins, J.G. Randolph
Clinical Professors W.S. McCune, V.M. Iovine, Alec Horwitz, G.A. Hip Jr., E.A. Gould, Francis Jackson
Associate Professors H.C. Pierpont, T.C. Alford, J.E. McClenathan, P.E. S Jr., N.T. Tsangaris, J.R. Lilly, W.L. Joseph
Associate Clinical Professors J.R. Thistlethwaite, D.C. Wherry, Maxine Sch ter, S.G. Mead *(Oral)*, J.H. Baugh, N.P.D. Smyth, Leon Gerber, D.H. U Jr., Don Wenger, R.L. Reis
Associate Professorial Lecturer L.E. Church *(Oral)*
Assistant Professors R.P. Altman, J.L. Hill
Assistant Clinical Professors L.B. Burk, Jr., William Ferguson, J.M. Keshish J.J. Weinstein, Isabella Harrison, J.T. Estes, Ernst Bremer, F.B. Bro J.W. Canter, J.B. Harrell, N.H. Isaacson, L.R. Perna, S.M. Kirson, Ferna Sacasa *(Oral)*, T.M. Wright, R.D. Shapiro *(Oral)*, F.A. Camp, L.T. Bow A.G. Coran, J.D. Alford
Instructors F.B. Liebler, Kathryn Anderson
Clinical Instructors J.F. Conlon *(Oral)*, B.G. Brown, J.H. Sager, Gerard Je giato, J.E. Peterson, Charles Rickerich, J.R. McClelland, G.E. Wi Sheldon Holen *(Periodontics)*, C.A. Silva, E.R. Lamm, K.S. Latchis, W Moyle, Jr.
Special Lecturer D.F. Lynch *(Oral)*

*303 **Clinical Clerkship** (15)

12 weeks at Univ., D.C. Gen., V.A., and Children's hosps.

378 **Advanced Surgery** (5)

Participation in total patient care, including operative procedures and close supervision. 3 seniors; 4-week elective periods. Andrews Air Fo Base Hosp. (September–May)

* Required for medical students.

379 **Advanced Surgery** (5) **Staff**

Same as Surg 378. 3 seniors; 4-week elective periods. Wash. Hosp. Center. (September–May)

380 **Advanced Surgery** (5) **Staff**

Same as Surg 378. 3 seniors; 4-week elective periods. Univ. Hosp. (September–May)

381 **Advanced Surgery** (5) **Staff**

Same as Surg 378. 3 seniors; 4-week elective periods. Walter Reed Gen. Hosp. (September–May)

382 **Advanced Surgery** (5) **Staff**

Same as Surg 378. 3 seniors; 4-week elective periods. V.A. Hosp. (September-May)

384 **Thoracic-Cardiovascular Surgery** (5) **Adkins**

Basic principles of research in thoracic, cardiac, or peripheral vascular surgery; assigned reading; experience in clinical and experimental studies. 2 seniors; 4-week elective periods. Univ. Hosp. and Clinic (September–May)

385 **Head and Neck Surgery** (5) **Klopp**

Study of new patients and follow-up of treated cases, minor surgical procedures, observation of operating room procedures, and assigned reading. 1 senior; 4-week elective periods. Univ. Hosp. and Clinic (September–May)

386 **Pediatric Surgery** (5) **Randolph**

Participation in an active, closely-supervised surgical service for infants and children; includes congenital defects, cardiac surgery, trauma, and neoplasms. Diagnostic studies, preoperative and postoperative care, and operating room procedures. 3 seniors; 4-week elective periods. Children's Hosp. (September–May)

387 **Plastic Surgery** (5)

Basic aspects of plastic and reconstructive surgery. 2 seniors; 4-week elective periods. (September–May)

389 **Surgical Preceptorship** (5) Iovine, McCune, Thistlethwaite, Isaacson

Participation in general care of surgical patients in an office setting. 3 seniors; 4-week elective periods. (September–May)

390 **Extramural Surgery Elective** (arr.)

The Department may arrange for selected students to spend elective periods at other institutions. Interested students should contact the Chairman of the Department.

391 **Acute General Surgery** (5) **Staff**

Participation in the evaluation and care of acute trauma and emergency situations at the Emergency Rooms. 2 seniors; 4-week elective periods. Univ. Hosp. and Wash. Hosp. Center (September–May)

392 **Peripheral Vascular Surgery** (5) Keshishian, Smyth

Study and application of vascular surgery with clinical experience. 1 senior; 4-week elective periods. Wash. Hosp. Center (September–May)

393 **Pediatric Cardiac Surgery** (5) McClen

Participation in the care and study of congenital heart disease. 1 s
4-week elective periods. Children's Hosp. (September–May)

394 **Surgical Immunology** (5 or 10) T. A

Methods of separating antigens from human tumors and their imm
logical effects in autologous and allogenic patients. Present techniqu
tissue typing in potential organ recipients. 1 senior; 4- or 8-week el
periods. Surgical Research Lab., Warwick Bldg. (September–Ma

395 **Experimental Surgery** (5) Jo

Participation in existing research projects, assigned reading, experim
operative procedures. 2 seniors; 4-week elective periods. Surgical
search Lab., Warwick Bldg. (September–May)

399 **Disaster Medicine** (1) Pier

Emergency medical care; teaching films, open discussion on manage
of "on the scene" trauma and mass casualty situations. (Fall)

Urology

Chairman: F.C. Derrick, Jr.

Professors L.R. Culbertson, F.C. Derrick, Jr.
Clinical Professors E.E. Ferguson, W.D. Jarman
Associate Professor F.J. Frensilli
Associate Clinical Professors F.T. Reuter, H.A. Goldberg
Assistant Clinical Professors Gilbert Ottenberg, G.R. MacDonald, R.C. Rha
John Kenealy, George Dudas, H.J. Klapproth, R.E. Ware, W.L. Banfield
I.S. Young, Chalon Rodriguez, E.H. Soifer, I.J. Spence
Clinical Instructors Hernando Salcedo, C.W. Schmidt, F.B. Hendricks, Barb
Black
Ro

380 **Clinical Urology** (5)

Outpatient and diagnostic urology, cystoscopy and radiographic p
dures. 1 senior; 4-week elective periods. Univ. Hosp. (January
March 25)

381 **Clinical Urology** (5) Derrick, Fren

Observation of urologic conditions and procedures for diagnosis
treatment, radiologic and pathologic studies, endoscopy and surg
collateral reading, weekly staff conference. 2 seniors; 4-week el
periods. Univ. Hosp. (September–May)

382 **Clinical Urology** (5) Derrick, Fren

Observation of urologic conditions and procedures for diagnosis
treatment, radiologic and pathologic studies, endoscopy and surgery,
lateral reading, weekly staff conference. 2 seniors; 4-week elective pe
V.A. Hosp. (January–May)

390 **Extramural Urology Elective** (arr.)

The Department may arrange for selected students to spend elec
periods in other institutions. Interested students should contact the C
man of the Department.

THE SCHOOL OF MEDICINE

Faculty and Staff of Instruction*

EMERITI

rrett Cyril Albritton, *Professor Emeritus of Physiology*
B.A. 1916, University of Missouri, Columbia; M.D. 1921, Johns Hopkins University

Harry Ford Anderson, *Professor Emeritus of Dermatology and Syphilology*
M.D. 1924, University of Cincinnati

Walter Andrew Bloedorn, *Professor Emeritus of Medicine*
M.D. 1909, Creighton University; B.A. 1915, M.A. 1916, Sc.D. 1948, George Washington University

Thomas McPherson Brown, *Professor Emeritus of Medicine*
B.A. 1929, Swarthmore College; M.D. 1933, Johns Hopkins University

Dexter Means Bullard, *Professor Emeritus of Clinical Psychiatry*
Ph.B. 1920, Yale University; M.D. 1923, University of Pennsylvania

Frank Duncan Costenbader, *Professor Emeritus of Clinical Ophthalmology*
B.S. 1925, Hampden-Sydney College; M.D. 1929, University of Virginia

Henry Lauran Darner, *Professor Emeritus of Clinical Obstetrics and Gynecology*
B.A. 1916, Western Maryland College; M.D. 1920, Johns Hopkins University

Paul Frederick Dickens, *Professor Emeritus of Clinical Medicine*
M.D. 1908, University of Nashville

William Rankin Duryee, *Research Professor Emeritus of Pathology (Experimental), in Residence*
B.A. 1927, Ph.D. 1933, Yale University

Dayton Bernard Ethridge, *Professor Emeritus of Medicine*
M.D. 1933, University of Virginia

ames Quincy Gant, Jr., *Professor Emeritus of Clinical Dermatology*
B.A. 1930, M.S. 1931, Ohio State University; M.D. 1935, Medical College of Virginia of Virginia Commonwealth University

eyden Kirby-Smith, *Professor Emeritus of Clinical Dermatology*
B.S. 1927, University of the South; M.D. 1937, George Washington University

hester Elwood Leese, *Professor Emeritus of Physiology*
B.A. 1922, M.A. 1925, Ph.D. 1930, University of Iowa

dward Lewis, *Professor Emeritus of Clinical Pediatrics*
M.D. 1918, George Washington University

*The Faculty and Staff of Instruction listed here and at the head of each department is for the academic year 1971–72.

Preston Alexander McLendon, *Professor Emeritus of Pediatrics*
B.S. 1913, Wake Forest University; M.D. 1915, Columbia University

Daniel Bruce Moffett, *Professor Emeritus of Otolaryngology*
B.A. 1910, University of Richmond; M.D. 1915, University of Maryland

Margaret Mary Nicholson, *Professor Emeritus of Clinical Pediatrics*
B.A. 1922, M.D. 1925, George Washington University

George Nordlinger, *Professor Emeritus of Clinical Obstetrics and Gyneco*
B.A. 1918, M.D. 1922, George Washington University

Leland Wilbur Parr, *Professor Emeritus of Bacteriology*
B.S. 1916, Ph.D. 1923, University of Chicago

Herbert Pollack, *Professor Emeritus of Clinical Medicine (Biochemistry)*
B.A. 1925, Washington and Lee University; M.D. 1929, Cornell University; Ph.D. 19
versity of Minnesota, Minneapolis-St. Paul

Frederick A. Reuter, *Professor Emeritus of Urology*
M.D. 1916, George Washington University

Benjamin Rones, *Professor Emeritus of Clinical Ophthalmology*
B.A. 1922, M.D. 1926, Johns Hopkins University

Ernest Alfred Watson Sheppard, *Professor Emeritus of Clinical Ophthal*
M.D., C.M. 1926, Queens University, Canada

Donald Harrison Stubbs, *Professor Emeritus of Clinical Anesthesiology*
B.A. 1929, M.A. 1931, M.D. 1932, George Washington University

Thomas Carlton Thompson, *Professor Emeritus of Clinical Urology*
B.S. in Med., M.D. 1920, George Washington University

Janet Graeme Travell, *Professor Emeritus of Clinical Medicine*
B.A. 1922, Wellesley College; M.D. 1926, Cornell University

James Winston Watts, *Professor Emeritus of Neurological Surgery*
B.S. 1924, Virginia Military Institute; M.D. 1928, University of Virginia

Richard Wallace Wilkinson, *Professor Emeritus of Clinical Ophthalmology*
B.A. 1925, M.D. 1928, George Washington University; M.S. in Med. 1932, Univ
Pennsylvania

ACTIVE

Theodore Judson Abernethy, *Associate Clinical Professor of Medicine*
B.S. 1925, Denison University; M.D. 1929, Johns Hopkins University

Abe Samuel Abraham, *Associate Clinical Professor of Psychiatry*
B.S. 1938, Westminster College, Pennsylvania; M.D. 1950, George Washington University

Kristof Abraham, *Assistant Clinical Professor of Neurology*
M.D. 1952, Budapest University, Hungary

Herbert Abramson, *Associate Clinical Professor of Medicine*
B.A. 1924, M.A. 1925, M.D. 1935, George Washington University

R. Marshall Ackerman, *Clinical Instructor in Orthopaedic Surgery*
B.S. 1958, M.D. 1962, University of Pittsburgh

John Pletch Adams, *Professor of Orthopaedic Surgery*
B.S. 1943, University of Missouri, Columbia; M.D. 1945, Washington University

Edward Adelson, *Associate Clinical Professor of Medicine*
B.S. 1943, M.D. 1947, Tufts University

Paul Charles Adkins, *Professor of Surgery*
B.A. 1944, M.D. 1948, Johns Hopkins University

Marvin Leon Adland, *Associate Clinical Professor of Psychiatry*
B.S. 1941, M.D. 1943, University of Chicago

Mohan Teckchand Advani, *Assistant Clinical Professor of Psychiatry*
B.S. 1955, Punjab University, India; M.B., B.S. 1960, Osmani University, India, D.P.M.
Mysore University, India

Lewis Francis Affronti, *Associate Professor of Microbiology*
B.A. 1950, M.A. 1951, State University of New York at Buffalo; Ph.D. 1958, Duke University

Saimo Ajmone Marsan, *Assistant Clinical Professor of Neurology*
M.D. 1942, University of Torino, Italy

Robert Wayne Albers, *Professorial Lecturer in Biochemistry (Brain)*
B.S. 1950, University of Nebraska; Ph.D. 1954, Washington University

Shalom Albert, *Assistant Clinical Professor of Anesthesiology*
B.A. 1949, M.D. 1953, American University of Beirut, Lebanon

Ernest Narinder Albert, *Assistant Professor of Anatomy*
B.S. 1959, High Point College; M.S. 1963, University of Pittsburgh; Ph.D. 1965, Georgetown University

Shlomon Naphtali Albert, *Assistant Clinical Professor of Anesthesiology*
B.A. 1936, M.D. 1940, American University of Beirut, Lebanon

Yousef Al-Doory, *Assistant Professor of Epidemiology and Environmental Health*
B.S. 1945, University of Baghdad, Iraq; M.A. 1951, University of Texas at Austin; Ph.D. 1954, Louisiana State University, Baton Rouge

James David Alford, *Assistant Clinical Professor of Surgery*
B.A. 1959, M.D. 1966, University of North Carolina at Chapel Hill

Theodore Crandall Alford, *Associate Professor of Surgery*
B.A. 1944, Haverford College; M.D. 1947, Johns Hopkins University

Frank Duane Allan, *Professor of Anatomy*
B.S. 1947, M.S. 1949, University of Utah; Ph.D. 1954, Louisiana State University, Baton Rouge

James Curwood Aller, *Associate Professor of Clinical Engineering*
B.S. 1942, U.S. Naval Academy; M.A. 1949, M.E.S. 1954, Harvard University; D.Sc. 1968, George Washington University

Melvin Gustavus Alper, *Clinical Professor of Ophthalmology*
B.A. 1943, M.D. 1945, University of Virginia

Hubert Joseph Alpert, *Clinical Instructor in Medicine*
M.D. 1962, University of Illinois

Louis Katz Alpert, *Professor of Medicine*
B.S. 1928, M.D. 1932, Yale University

Seymour Alpert, *Professor of Anesthesiology; Vice President of the University, for Development*
B.A. 1939, Columbia University; M.D. 1943, State University of New York, Downstate Medical Center

Roy Peter Altman, *Assistant Professor of Surgery and of Child Health and Development*
B.A. 1955, Colgate University; M.S. 1958, University of Rochester; M.D. 1961, New York Medical College

James Francis Ambury, *Assistant Clinical Professor of Medicine*
B.S. 1937, Fordham University; M.D. 1941, Georgetown University

Sirus Amiri, *Clinical Instructor in Child Health and Development*
M.D. 1956, University of Tehran, Iran

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B.S. 1939, M.D. 1943, George Washington University

Arthur James Anderson, *Clinical Instructor in Medicine*
M.D. 1961, George Washington University

James Edward Anderson, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1955, Union College, Nebraska; M.D. 1965, Loma Linda University

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B.A. 1961, M.A. 1964, Cambridge University, England; M.D. 1964, Harvard University

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M.D. 1946, Duke University

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B.A. 1958, M.D. 1963, Harvard University; M.A. 1960, Cambridge University, England

William Staton Anderson, *Clinical Professor of Child Health and Developm*
B.A. 1927, Duke University; M.D. 1931, Johns Hopkins University

John Lawrence Angel, *Professorial Lecturer in Anatomy and Anthropology*
B.A. 1936, Ph.D. 1942, Harvard University

Albert Anthony Apicelli, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1961, Fordham University; M.D. 1965, Albany Medical College of Union University

Leonard Philip Appel, *Clinical Instructor in Medicine*
B.A. 1953, M.D. 1957, New York University

Ronald Alan Apter, *Assistant Clinical Professor of Medicine*
M.D. 1958, George Washington University

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M.D. 1957, M.S.D. 1962, Tokyo Medical and Dental University, Japan

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B.A. 1948, New York University; M.D. 1954, New York Medical College

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B.A. 1950, National College of Saint Bartholomew, Colombia; M.D. 1957, National Univers
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B.A. 1965, University of Minnesota, Minneapolis-St. Paul; M.D. 1969, Harvard Universi

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B.A. 1947, M.D. 1952, American University of Beirut, Lebanon; M.S. 1957, Universit
Iowa

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B.A. 1951, Brown University; M.D. 1955, Tufts University

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B.S. 1958, City University of New York, City College; M.D. 1962, New York University

Gunter Josef Augustin, *Assistant Clinical Professor of Radiology*
M.D. 1952, University of Heidelberg, Germany

Jorge Ignacio Auñón, *Research Instructor in Anesthesiology*
B.S. in Engr. 1967, M.S. 1969, George Washington University

Simon Leo Auster, *Assistant Clinical Professor of Psychiatry*
B.A. 1952, Yeshiva University; M.D. 1956, New York University

Gordon Avery, *Professor of Child Health and Development*
B.A. 1953, Harvard University; M.D. 1958, Ph.D. 1959, University of Pennsylvania

William Ross Ayers, *Associate Professor of Clinical Engineering*
B.S. 1957, M.D., 1961, Georgetown University

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B.A. 1965, M.A. 1967, Ph.D. 1970, Catholic University of America

Silas Babin, Jr., *Assistant Clinical Professor of Medicine*
M.D. 1951, Louisiana State University Medical Center, New Orleans

Frank Solomon Bacon, *Associate Clinical Professor of Medicine*
B.S. 1928, M.B. 1930, M.D. 1931, University of Minnesota, Minneapolis-St. Paul

James Michael Bacos, *Associate Professor of Medicine*
B.S. 1948, Virginia Polytechnic Institute and State University; M.D. 1953, Duke University

Robert Emil Badwey, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1955, Franklin and Marshall College; M.D. 1959, University of Pittsburgh

Alfred Baer, *Associate Clinical Professor of Medicine*
B.A. 1942, Ohio State University; M.D. 1945, Johns Hopkins University

William Eldridge Bageant, *Assistant Clinical Professor of Anesthesiology*
M.D. 1939, George Washington University

John Martyn Bailey, *Professor of Biochemistry*
B.S. 1949, Ph.D. 1952, D.Sc. 1970, University of Wales

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M.D. 1940, George Washington University

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B.A. 1950, Syracuse University; M.D. 1954, State University of New York, Upstate Medical Center

Joseph Baker, *Associate Clinical Professor of Psychiatry*
B.A. 1940, Sc.D. 1970, Gettysburg College; M.D. 1944, Temple University

Guillermo Alfredo Balfour, *Special Lecturer in Child Health and Development*
M.D. 1959, University of Buenos Aires, Argentina

Giuseppe Balsamo, *Assistant Clinical Professor of Medicine*
Laurea in Medicinae Chirurgia 1952, University of Rome, Italy

Bernard Alvin Band, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1952, B.S. 1954, George Washington University; M.D. 1959, Howard University

William Landon Banfield III, *Assistant Clinical Professor of Urology*
B.A. 1954, Princeton University; M.D. 1958, George Washington University

Samuel Harvard Barboo, Jr., *Assistant Professorial Lecturer in Epidemiology and Environmental Health*
B.S. 1955, M.P.H. 1957, University of California, Berkeley; Dr.P.H. 1966, University of California, Los Angeles

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B.A. 1955, Princeton University; M.D. 1959, Johns Hopkins University

Ann Birnbaum Barnet, *Associate Professor of Neurology and of Child Health and Development*
B.A. 1951, Sarah Lawrence College; M.D. 1956, Harvard University

Solomon Efrem Barr, *Assistant Clinical Professor of Medicine*
B.A. 1951, M.D. 1954, George Washington University

Andre Barrabini, *Clinical Instructor in Medicine*
M.D. 1953, University of Paris, France

John William Barrett, *Clinical Instructor in Neurological Surgery*
M.D. 1958, George Washington University

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B.S. 1937, M.D. 1940, University of Wisconsin, Madison

Walter Earl Barton, *Professorial Lecturer in Psychiatry*
B.S. 1928, M.D. 1931, University of Illinois

William Howard Barton, *Assistant Clinical Professor of Child Health and Development (Psychiatry)*
B.A. 1955, Yale University; M.D. 1960, University of Tennessee at Memphis

Emil Herbert Bauersfeld, *Assistant Clinical Professor of Medicine*
B.A. 1932, M.D. 1935, George Washington University

Joseph Harold Baugh, *Associate Clinical Professor of Surgery*
B.S. 1949, Wilmington College, Ohio; M.D. 1953, St. Louis University

David Lionel Bazelon, *Clinical Professor of Psychiatry (Socio-legal Aspects)*
B.S. in Law 1931, Northwestern University, LL.D. 1966, Colby College

Harry Carl Beaver, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1959, Wheaton College, Illinois, M.D. 1963, George Washington University

Arthur Abbe Becker, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1956, City University of New York, City College; M.D. 1961, University of Iowa

Kenneth Louis Becker, *Associate Professor of Medicine*
B.A. 1952, University of Michigan, M.D. 1956, New York Medical College; Ph.D. 1963, University of Minnesota, Minneapolis-St. Paul

Norman Evans Beisaw, *Clinical Instructor in Orthopaedic Surgery*
B.A. 1958, Bowdoin College; M.D. 1962, New York University

Myron Lowell Belfer, *Clinical Instructor in Child Health and Development*
B.A. 1961, University of Rochester; M.D. 1965, Yeshiva University

Samuel Michael Belinsky, *Assistant Clinical Professor of Obstetrics and cology*
B.A. 1955, University of Bridgeport; M.D. 1959, George Washington University

Leopold Bellak, *Clinical Professor of Psychiatry*
M.A. 1939, Boston University; M.A. 1942, Harvard University; M.D. 1944, New York College

Robert Reid Belton, *Associate Clinical Professor of Medicine*
B.A. 1944, Willamette University; M.D. 1948, George Washington University

Ruth Boschwitz Benedict, *Associate Clinical Professor of Medicine*
B.A. 1935, Wellesley College; M.D. 1939, New York University

E. Paul Benoit, *Associate Research Professor of Medicine (Clinical Psych*
M.A. 1952, Ph.D. 1955, University of Connecticut

Roger Bergstrom, *Clinical Instructor in Child Health and Development*
M.D. 1952, George Washington University

Peter Morris Berkman, *Assistant Professor of Medicine*
B.A. 1955, Harvard University; M.D. 1959, Columbia University

David Kip Berler, *Assistant Clinical Professor of Ophthalmology*
B.A. 1955, M.D. 1958, Cornell University

Cheston Milton Berlin, Jr., *Special Lecturer in Child Health and Develop*
B.A. 1958, Haverford College; M.D. 1962, Harvard University

Robert William Berliner, *Special Lecturer in Medicine (Renal Diseases)*
B.S. 1936, Yale University; M.D. 1939, Columbia University

Harry Louis Berman, *Assistant Clinical Professor of Radiology*
B.S. 1937, Bradley University; M.B. 1932, M.D. 1933, Northwestern University

Sidney Berman, *Clinical Professor of Psychiatry*
B.S. 1928, M.D. 1932, Georgetown University

Howard Nathan Bernstein, *Assistant Clinical Professor of Ophthalmology*
B.S. 1953, Bucknell University; M.D. 1957, State University of New York, Downstate M Center

Leon Bernstein, *Professor of Medicine*
B.S. 1939, Ph.D. 1957, University of London, England; L.R.C.P. 1949, Royal Colle Physicians, England; M.R.C.S. 1949, Royal College of Surgeons, England

Solomon Rodney Bersack, *Assistant Clinical Professor of Radiology*
B.S. 1931, City University of New York, City College; M.D. 1935, New York University

Christopher Theodore Bever, *Associate Clinical Professor of Psychiatry*
B.A. 1940, M.D. 1943, Harvard University

Lewis Henry Biben, *Assistant Clinical Professor of Medicine*
M.D. 1949, Hahnemann Medical College

Harvey Robert Birschbach, *Clinical Instructor in Medicine*
B.S. 1959, M.D. 1963, Marquette University

Barbara Onderchek Black, *Clinical Instructor in Urology*
B.A. 1962, Trinity College, D.C.; M.D. 1966, Georgetown University

Edward Black, *Assistant Clinical Professor of Psychiatry*
B.S. 1959, Dickinson College; M.D. 1963, New York Medical College

Emilie Annabelle Black, *Clinical Instructor in Child Health and Developme*
B.S. 1942, M.D. 1945, George Washington University

Brian Blades, *Lewis Saltz Professor of Surgery*
B.A. 1928, University of Kansas; M.D. 1932, Washington University

Ethel Joan Blanchette-Mackie, *Associate Professorial Lecturer in Anatomy*
B.S. 1956, City University of New York, Queens College; M.S. 1959, New York Univ Ph.D. 1965, Columbia University

Robert Allan Blum, *Clinical Instructor in Psychiatry*
B.S. 1959, M.S. 1960, Massachusetts Institute of Technology; M.D. 1964, University of P sylvania

Joe Morris Blumberg, *Clinical Professor of Pathology*
B.S. 1930, M.D. 1933, Emory University

Robert Joel Bobys, *Clinical Instructor in Otolaryngology*
M.D. 1963, Georgetown University

George Pierce Bogumill, *Assistant Clinical Professor of Orthopaedic Surgery*
B.S. 1952, M.S. 1954, Ph.D. 1955, M.D. 1959, University of Wisconsin, Madison

Norman Kay Bohrer, *Clinical Instructor in Medicine*
M.D. 1957, George Washington University

James Lee Bolen, *Clinical Instructor in Medicine*
B.A. 1965, Emory University; M.D. 1969, Johns Hopkins University

Frank Joseph Borsody, *Clinical Instructor in Medicine*
B.A. 1955, George Washington University; M.D. 1960, University of Virginia

John Andrew Bottiglione, *Special Lecturer in Child Health and Development*
B.S. 1958, University of Notre Dame; M.D. 1962, Seton Hall University

David John Boullin, *Special Lecturer in Pharmacology*
B.S. 1956, B.S. 1958, M.S. 1960, University of London, England; Ph.D. 1963, University of St. Andrews, Scotland

John Henry Bouma, *Assistant Clinical Professor of Psychiatry*
B.A. 1948, B.S. 1949, M.B. 1952, M.D. 1953, University of Minnesota, Minneapolis-St. Paul

Lawrence Thompson Bowles, *Assistant Clinical Professor of Surgery*
B.A. 1953, M.D. 1957, Duke University; M.S. 1957, New York University

Roscoe Brady, Jr., *Professorial Lecturer in Biochemistry (Brain)*
M.D. 1947, Harvard University

Carl David Brandt, *Assistant Professor of Child Health and Development (Microbiology)*
B.S. 1949, University of Connecticut; M.S. 1951, University of Massachusetts, Amherst; Ph.D. 1958, Harvard University

Frederick Bertram Brandt, *Assistant Clinical Professor of Surgery*
B.S. 1942, M.D. 1943, University of Maryland

M. Eduardo Bravo, *Clinical Instructor in Child Health and Development*
B.S., M.D. 1966, Peruvian University

Ernst Bremer, *Assistant Clinical Professor of Surgery*
M.D. 1949, University of Marburg, Germany

Gloria Godbey Brennan, *Assistant Clinical Professor of Pathology*
B.A. 1949, M.D. 1952, George Washington University

Alexander Breslow, *Associate Professor of Pathology*
B.S. 1948, M.S., M.D. 1953, University of Chicago

Alice Brigham, *Assistant Clinical Professor of Medicine*
B.A. 1936, M.D. 1941, University of Michigan

Albert Seymour Bright, *Clinical Instructor in Obstetrics and Gynecology*
B.A. 1935, M.D. 1938, George Washington University

Warren Daniel Brill, *Associate Clinical Professor of Medicine*
B.S., M.D. 1944, University of Maryland

Bernard Beryl Brodie, *Professorial Lecturer in Pharmacology*
B.S. 1931, McGill University, Canada; Ph.D. 1935, New York University

Bertram Brown, *Clinical Professor of Psychiatry*
B.A. 1952, City University of New York, Brooklyn College; M.D. 1956, Cornell University; M.P.H. 1960, Harvard University

Brooks Gideon Brown, *Clinical Instructor in Surgery*
M.D. 1939, George Washington University

Crawford Southwell Brown, *Assistant Clinical Professor of Dermatology*
B.A. 1946, Kenyon College; M.D. 1948, University of Michigan

Halla Brown, *Professor of Medicine*
M.D. 1939, Johns Hopkins University

Raymond Nathan Brown, *Associate Clinical Professor of Anatomy*
M.D. 1943, George Washington University

Blackwell Smith Bruner, *Clinical Instructor in Ophthalmology*
M.D. 1963, George Washington University

Helmut Brunner, *Research Instructor in Child Health and Development*
M.D. 1966, Institute for Hygiene and Microbiology, Germany

Philip Craig Brunschwyler, *Assistant Clinical Professor of Child Health and Development*
B.A. 1951, West Virginia University; M.D. 1955, University of Maryland

Thomas Bryant, *Professorial Lecturer in Medical and Public Affairs*
B.A. 1958, M.D. 1962, J.D. 1967, Emory University

George Cumming Buchanan, *Assistant Clinical Professor of Medicine*
B.A. 1943, Duke University; M.D. 1948, Johns Hopkins University

Lloyd Byron Burk, Jr., *Assistant Clinical Professor of Surgery*
B.A. 1938, M.D. 1942, University of Virginia

William Wesley Burr, Jr., *Professorial Lecturer in Biochemistry (Isotopes)*
B.A. 1947, University of Nebraska; M.S. 1948, Ph.D. 1951, University of Illinois; M.D. University of Texas Medical Branch, Galveston

Boyd Lee Burris, *Assistant Clinical Professor of Psychiatry*
B.S. 1951, University of Tennessee, Knoxville; M.D. 1952, University of Tennessee at Me

James Burwell, *Clinical Instructor in Radiology*
B.A. 1952, University of Pittsburgh; M.D. 1956, University of Maryland

Stewart William Bush, *Associate Clinical Professor of Medicine*
B.S. 1943, University of Massachusetts, Amherst; M.D. 1946, Johns Hopkins University

Robert Neil Butler, *Assistant Clinical Professor of Psychiatry*
B.A. 1949, M.D. 1953, Columbia University

Allan Bartlett Cady, *Assistant Clinical Professor of Medicine*
B.S. 1958, M.D. 1960, University of Illinois

Paul Calabrisi, *Alumni Professor of Anatomy*
B.A. 1931, Catholic University of America; M.A. 1940, George Washington University; (Cantab.) 1955, Cambridge University, England

Dale Corbin Cameron, *Clinical Professor of Psychiatry*
B.A. 1933, M.D. 1936, University of Nebraska; M.P.H. 1951, Johns Hopkins University

Frank Alphonse Camp, *Assistant Clinical Professor of Surgery*
B.A. 1954, College of the Holy Cross; M.D. 1958, Syracuse University

Carey Walton Campbell, *Instructor in Neurological Surgery*
B.S. 1960, University of Southern Mississippi; M.D. 1964, University of Mississippi

Carlena Lee Campbell, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1955, West Virginia University; M.D. 1957, Medical College of Virginia of Virginia Commonwealth University

Jerome Wolf Canter, *Assistant Clinical Professor of Surgery*
M.D. 1955, George Washington University

David Roland Carlson, *Clinical Instructor in Obstetrics and Gynecology*
B.S. 1953, Drake University; M.D. 1960, George Washington University

Charles Patrick Henry Carroll, *Clinical Instructor in Neurological Surgery*
B.A. 1952, Boston College; M.D. 1961, Georgetown University

Marie Mullaney Cassidy, *Associate Professor of Physiology*
B.S. (General) 1957, B.S. (Special) 1958, M.S. 1959, Ph.D. 1962, National University of Ireland

Richard Bernard Castell, *Assistant Clinical Professor of Medicine; Director, Student Health Service*
B.A. 1932, M.D. 1935, George Washington University

Hereward Seagrieve Cattell, *Assistant Clinical Professor of Orthopaedic Surgery*
B.A. 1954, Amherst College; M.D. 1958, University of Rochester

Ralph Mearle Caulk, *Associate Clinical Professor of Radiology*
M.D. 1934, University of Kansas

William Paxson Chalfant, Jr., *Assistant Clinical Professor of Ophthalmology*
M.D. 1934, Hahnemann Medical College

Morris Jay Chalick, *Assistant Clinical Professor of Psychiatry*
B.A. 1958, University of Pennsylvania; M.D. 1962, Thomas Jefferson University

Thomas Clark Chalmers, *Professor of Medicine*
M.D. 1943, Columbia University

John Loomis Chamberlain III, *Assistant Clinical Professor of Child Health and Development*
B.S. 1953, Amherst College; M.D. 1957, University of Virginia

Chao Hung Chan, *Assistant Professor of Medicine*
B.B.A. 1955, M.D. 1962, University of the East, Philippines

Caroline Augusta Chandler, *Special Lecturer in Child Health and Development*
B.A. 1929, Barnard College; M.D. 1933, Yale University

Paul P.L. Chang, *Clinical Instructor in Medicine*
M.D. 1959, National Taiwan University

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B.A. 1970, Franklin and Marshall College
...mick, Roger — W.Va.
B.B.A. 1970, Marshall University
Bacon, John R. — Md.
B.S. 1970, George Washington University
Ball, John T. — Calif.
B.A. 1970, University of Virginia
Baisley, Ellen J. — Va.
B.A. 1967, Indiana University at Bloomington
Bane, Susan H. — Md.
B.A. 1968, George Washington University
...rr, John L., III — Md.
B.A. 1966, Harvard University
...sey, Walter B. — Md.
B.S. 1970, University of Maryland
...ks, John K. — Calif.
B.A. 1970, George Washington University
...rlin, Gregory S. — Wash.
B.A. 1970, University of Washington
...lline, Paul M. — Calif.
B.A. 1970, Whitman College
...lumberg, Andrew M. — N.J.
B.S. 1970, University of Wisconsin, Madison
...yd, James C. — Md.
Attended University of Maryland
...rgess, Scott E. — N.Y.
B.A. 1970, George Washington University
...rtoff, Bruce D. — D.C.
B.A. 1970, University of Pennsylvania
...llahan, Michael E. — Utah
B.S. 1970, Brigham Young University
...mp, Gregory V. — Ore.
B.S. 1968, University of Oregon
...rnen, John C. — Wyo.
B.S. 1970, University of Wyoming
...affee, Charles T. — Wash.
B.A. 1970, University of Washington
...rk, Thomas H. — Va.
B.S. 1970, George Washington University
...rnelius, Douglas H. — Colo.
Attended University of Colorado
...swell, George F — Md.
Attended Washington and Lee University
...mont, Lawrence A. — Ind
B.A. 1970, University of Pennsylvania
...chter, George M. — Conn.
B.S. 1964, Fairfield University

Donovan, Joseph W. — N.Y.
B.A. 1969, Manhattan College
Downing, Terence P. — Wash.
B.A. 1970, University of Washington
Eisner, Martin E. — N.Y.
B.A. 1970, University of Wisconsin, Madison
Engleberg, Niels C. — Md.
B.S. 1970, George Washington University
Falkowski, Walter S. — N.J.
B.S. 1967, St. Peter's College, N.J.
M.A. 1969, Princeton University
Ferguson, Edwin E., Jr. — Md.
B.S. 1966, University of Rochester
Finn, Peter V. — Mass.
B.A. 1970, University of Massachusetts, Amherst
Furlow, Terrance G. — Md.
Attended George Washington University
Gale, John H. — D.C.
B.A. 1970, Duke University
Gardner, Melinda M. — D.C.
B.A. 1965, Duke University
Gloster, Robert C. — Mass.
B.S. 1970, Georgetown University
Gluck, Rita K. — Va.
B.A. 1968, New York University
Goldblatt, Robert S. — N.Y.
B.A. 1970, George Washington University
Goldman, Steven L. — Mass.
B.S. 1970, George Washington University
Gorin, Michael E. — D.C.
B.A. 1970, Northwestern University
Greenberg, Allen L. — N.Y.
B.A. 1970, Franklin and Marshall College
Greene, Michael A. — D.C.
B.S. in E.E. 1964, State University of New York at Buffalo
Greenfield, Paul S. — N.J.
B.A. 1970, University of Pennsylvania
Hair, Joyce E. — Pa.
B.A. 1970, Hood College
Hall, Frank A. — Ala.
B.A. 1970, Emory University
Hardy, William R. — Calif.
B.A. 1970, University of California, Riverside
Hartz, Leo M. — Pa.
B.A. 1969, Pennsylvania State University
Henriksen, Gary L. — Wash
B.S. in Phar. 1970, University of Washington

Heron, Howard C., II — Md.
B.A. 1970, George Washington University

Hirsch, Florie — N.Y.
B.A. 1970, Barnard College

Hobbs, Charles L., III — Del.
B.A. 1969, Yale University

Howard, Douglas R. — Mass.
B.S. 1970, Brown University

Hsia, David Y. — Canada
B.A. 1970, Johns Hopkins University

Hurley, Michael S. — Va.
B.S. 1962, College of the Holy Cross
D.D.S. 1966, Georgetown University

Isaacson, Paul J. — Md.
B.A. 1970, Johns Hopkins University

Jenkins, Roger C., Jr. — Calif.
B.S. 1970, University of Washington

Kalu, Uduma O. — Nigeria
B.S. 1967, Iowa State University of Science and Technology
M.S. 1969, Howard University

Kaplan, Jack O. — N.Y.
B.S. 1970, George Washington University

Kass, Frederic H., III — N.J.
B.A. 1970, Colgate University

Kelly, Gregory B. — Conn.
B.S. 1970, University of Maryland

Kennedy, James J. — Md.
B.A. 1969, Duke University

Kerr, Vicky E. — S.C.
B.A. 1970, Boston University

Kestenbaum, David J. — N.Y.
B.A. 1970, Hofstra University

Kirchner, Nancy A. — Ind.
B.S. 1968, University of Maryland

Kutcher, Leslie M. — N.Y.
B.S. 1970, City University of New York, Brooklyn College

Laney, Steven R. — Wash.
B.S. 1970, University of Washington

Lau, Mark M. — Calif.
B.A. 1970, University of California, Berkeley

Lieberman, Jeffrey A. — Ohio
B.A. 1970, Miami University

Little, Albert G. — Md.
B.S. 1967, D.D.S. 1971, University of Maryland

London, David B. — Nev.
B.A. 1970, George Washington University

Ludlow, Paul C. — Calif.
B.S. 1970, Brigham Young University

Manart, Frank D. — Calif.
B.A. 1969, University of Southern California

Mangiaracina, Thomas A. — N.Y.
B.A. 1970, New York University

Marks, William A. — N.Y.
B.A. 1969, St. Lawrence University

McCormick, Joseph P. — N.Y.
B.A. 1969, Alfred University

McIntyre, Robert C. — Wash.
B.S. 1969, Washington State University

Miller, Robert E. — N.Y.
B.A. 1970, Hofstra University

Murray, Ives P. — N.Y.
B.A. 1969, University of Colorado

Newman, Robert E. — Md.
B.A. 1970, Lafayette College

Noguchi, Philip D.
B.A. 1970, University of California, Berk

Pagano, Samuel W.
B.A. 1970, Johns Hopkins University

Passeri, Ronald L.
B.A. 1970, Rutgers University, New Brun

Payes, William C.
B.S. 1970, Syracuse University

Poole, Robert W.
B.S. 1970, Dickinson College

Principi, Kathy L.
B.A. 1970, Rutgers University, New Brun

Rabinowitz, Asher D.
B.A. 1970, Yeshiva University

Radice, Peter A.
B.A. 1970, Yale University

Rogge, Janet L.
B.A. 1970, University of Washington

Ross, Gary S.
B.A. 1970, Colgate University

Ruby, Jo-Anne B.
B.S. 1967, M.S. 1970, George Washington University

Sacks, Maury E.
B.A. 1970, Lehigh University

Sarafan, Peter M.
B.A. 1970, Amherst College

Scalettar, Robert E.
B.A. 1969, University of Wisconsin, Madis

Sexton, Robert L.
B.S. 1970, Gonzaga University

Smith, Alan W.
B.S. 1970, Carson-Newman College

Smith, Kenneth R.
Attended Florida Atlantic University

Starke, Peter R.
B.A. 1970, Trinity College, Conn.

Sternburg, Jon K.
B.A. 1970, Bowdoin College

Taylor, Paul R.
B.A. 1970, Weber State College

Thomas, Katherine L.
Attended University of Arkansas

Thompson, John M.
B.S. 1970, Florida Southern University

Thomson, John W.
B.S. 1970, Brigham Young University

Tievsky, Andrew L.
B.A. 1970, University of Rochester

Trued, Sally J.
B.A. 1970, Northwestern University

Valk, Thomas H.
B.S. 1969, Harvey Mudd College

Van Brakle, John D.
B.S. 1970, Muhlenberg College

Vangrov, Mark S.
B.A. 1970, Miami University

Van Osdel, Lewis A., III
B.A. 1968, University of Washington

Whitfield, Peter W
B.A. 1969, University of Rhode Island

Wisotsky, Philip
B.A. 1970, Boston University

Yimoyines, Dean J.
B.A. 1969, Syracuse University

Zagorski, Joseph B.
B.A. 1969, University of Pennsylvania

THIRD YEAR

Adams, Elizabeth G. — Mass.
B.A. 1966, Wellesley College
Adkins, James W. — Conn.
B.A. 1969, Wesleyan University
Aimer, Seena C. — Mich.
B.S. 1969, Wayne State University
Bader, Robert F. — Calif.
B.A. 1969, University of California, Los Angeles
Banis, Joseph C. — Calif.
B.S. 1969, Loyola University of Los Angeles
Barbiere, Charles F. — N.Y.
B.A. 1969, New York University
Bass, Bernard N. — Mass.
B.A. 1969, George Washington University
Bentley, Wendell J. — Utah
B.S. 1970, University of Utah
Bishop, Norman R. — Md.
B.S. 1969, George Washington University
Bobrow, Nathan M. — Md.
Attended George Washington University
Bogran, Luis — Honduras
B.S. 1968, George Washington University
Bollinger, Bruce C. — Colo.
B.S. 1969, George Washington University
Boxall, David W. — Wis.
B.Arch. 1968, Carnegie-Mellon University
Boyd, Richard B. — Mass.
Attended Boston University
Brantner, Brian D. — Calif.
B.A. 1968, California Lutheran College
Broughton, Warren L. — Md.
B.A. 1970, George Washington University
Burstein, Darrell H. — Conn.
B.S. 1969, Trinity College, Conn.
Callihan, Thomas R. — Ohio
B.A. 1969, Kenyon College
Ceder, Lenart C. — Wash.
B.A. 1969, University of Washington
Chase, William D., Jr. — Mich.
B.A. 1969, University of Michigan
Coit, Alan S. — Texas
B.A. 1969, Colby College
Cooper, Wayne D. — N.J.
B.A. 1969, Alfred University
Crandall, Theodore L. — N.D.
B.A. 1969, University of North Dakota
Creaswell, Dianne L. — Md.
B.A. 1968, Muskingum College
Cricco, Robert P. — N.J.
B.S. 1969, Fairfield University
Crock, Thomas R. — Pa.
B.A. 1969, Johns Hopkins University
Curfman, David R. — Ohio
B.A. 1965, Columbia Union College
M.S. 1967, George Washington University
Defranzo, Anthony J. — Conn.
B.S. 1969, Trinity College, Conn.
Dunner, Frederick J. — Md.
B.S. 1967, George Washington University
Earls, Stephen T. — Mass.
B.A. 1970, George Washington University
Ehrlich, Dion R. — N.Y.
B.A. 1969, Franklin and Marshall College
Feller, Patricia A. — N.J.
B.A. 1969, Rutgers University, New Brunswick
Fiaschetti, Frank L. — N.Y.
B.S. 1969, Muhlenberg College
Frist, Brian S. — N.Y.
B.S. 1969, American University

Funt, Loren S. — Fla.
Attended George Washington University
Gersh, Elliot S. — Ohio
B.S. 1969, Ohio State University
Gladstein, Geoffrey S. — Conn.
B.A. 1969, University of Connecticut
Gray, William C. — Md.
B.S. 1969, University of Maryland
Hanowell, Ernest D. — Calif.
B.S. 1969, University of California, Davis
Harris, Jeffrey D. — N.Y.
B.A. 1968, Hofstra University
Hauptman, Alexander O. — N.J.
B.A. 1967, American University
Heller, Joel H. — N.J.
B.S., B.Phar. 1968, Rutgers University, New Brunswick
Hsieh, Robert C. — D.C.
B.S. 1969, George Washington University
Hunter, Bruce C. — Utah
B.S. 1969, Weber State College
Isaacs, Steven E. — N.Y.
B.S. 1967, St. Lawrence University
Javerbaum, Jeffrey S. — N.J.
B.A. 1969, Cornell University
Johnson, Mark Y. — Wash.
B.S. 1969, University of Washington
Johnson, Randall K. — Minn.
B.A. 1969, University of Minnesota, Minneapolis-St. Paul
Kaires, Pamela A. — N.Y.
B.S. 1969, State University of New York at Stony Brook
Kanda, Mireille B. — Haiti
B.S. 1969, American University
Kerns, Scott E. — Mich.
B.S. 1969, University of Michigan
Kohl, Cheryl A. — N.J.
B.A. 1969, Duke University
Kolb, Garry R. — Calif.
B.S. 1968, California State Polytechnic College, San Luis Obispo
Krakovitz, Robert W. — Pa.
B.A. 1969, Pennsylvania State University
Kuhn, Kerry L. — N.Y.
B.A. 1970, George Washington University
Lavine, Lawrence M. — Md.
B.S. 1965, Florida State University
Leeper, Willard S. — Calif.
B.S. 1970, Brigham Young University
Leva, Leo M. — Md.
B.A. 1968, Swarthmore College
Levin, Ronald H. — Conn.
B.A. 1969, Clark University
Lewin, Alan A. — N.J.
B.A. 1969, Temple University
Lewis, Allan J. — Ariz.
B.B.A. 1949, Texas Technological University
Lewis, David G. — Utah
B.S. 1969, University of Utah
Lipsett, Nathan W. — N.J.
B.A. 1969, Kenyon College
Liverett, David M. — Md.
B.A. 1969, University of Virginia
Luria, Alan S. — Fla.
B.A. 1969, University of Michigan
Mangan, Kenneth F. — Mass.
B.S. 1969, University of Massachusetts, Amherst

Manley, Michael D. — Calif.
B.A. 1967, M.A. 1970, Sacramento State College

Margules, Edward R. — Calif.
B.A. 1968, University of California, Los Angeles

Miller, Jeffrey P. — Miss.
B.S. 1968, Randolph-Macon College

Mugmon, Marc A. — Md.
Attended Georgetown University

Mulé, Salvatore — Conn.
B.A. 1969, University of Connecticut

Myles, Courtland L. — D.C.
B.S. 1968, American University

Partlow, Kenneth L. — Wash.
Attended University of Washington

Paszek, Michael J. — Conn.
B.S. 1969, Trinity College, Conn

Pechan, B. Warren — N.Y.
B.A. 1969, Cornell University

Penhos, Juan C. — Argentina
B.A. 1970, George Washington University

Peters, John R. — N.Y.
B.A. 1969, New York University

Phillips, Arnold G. — Md.
B.A. 1962, M.S. 1963, Wayne State University

Powell, Richard M. — Pa.
B.A. 1968, Temple University

Prioleau, George R., Jr. — S.C.
B.S. 1969, South Carolina State College

Ripley, Robert C. — Calif.
B.A. 1968, University of California, Berkeley

Rosenthal, Jesse S. — N.Y.
B.A. 1969, George Washington University

Ross, Stuart E. — D.C.
B.A. 1969, University of Pennsylvania

Rumsey, Eugene W. — Calif.
B.A. 1969, San Diego State College

Saffer, Jeffrey M. — N.J.
B.A. 1969, Dartmouth College

Schade, Robert R. — N.Y.
B.A. 1969, Colgate University

Schliftman, Ronald C. — N.Y.
B.A. 1969, George Washington University

Schonberg, Allan — N.Y.
B.S. 1966, Bethany College, West Virginia

Shapiro, Harvey H. — Ill.
B.A. 1965, Reed College

Siemers, Paul T. — Ill.
B.S. 1968, University of Illinois

Silverman, Eugene D. — D.C
B.A. 1970, George Washington University

Smith, Lois F. — Va.
B.S. 1969, Dickinson College

Smith, Richard J., Jr. — N.D.
B.S. 1969, University of North Dakota

Smolansky, Stephen J. — N.Y.
B.A. 1969, Temple University

Soben, Arthur L.
B.A. 1969, Rutgers University, New Bru

Sokol, Scott K.
B.A. 1969, Syracuse University

Spero, Charles R.
B.S. 1969, Columbia University

Stang, Howard D.
B.A. 1969, Rutgers University, New Bru

Stewart, Barry C.
B.A. in Bus.Adm. 1962, University of Washington

Sullivan, Timothy P.
B.S. 1969, St. Peter's College, N.J.

Sutton, Frederick J.
B.A. 1969, Cornell University

Sweet, Ronald C.
B.S. 1969, Wright State University

Tamagna, Ellen I
B.A. 1969, Goucher College

Thistlethwaite, Susan J.
B.A. 1969, Lycoming College

Thomas, Jane S
B.A. 1968, Cornell University

Thomas, Thomas, Jr
B.A. 1967, M.S. 1969, Pennsylvania State University

Travers, Charles K., Jr.
B.S. 1969, University of Maryland

Tvedt, Robert A.
B.A. 1969, Stanford University

Uman, Howard M.
B.A. 1969, Amherst College

Van de Water, Donald T.
B.S. 1969, George Washington University

Van der Werf, Joseph N.
B.A. 1969, Duke University

Van Meter, Keith
B.A. 1963, Miami University

Villarreal, Fernando A.
B.A. 1970, George Washington University

Wex, Timothy G.
B.A. 1969, Johns Hopkins University

Wilkenfeld, Morris
B.A. 1969, Lafayette College

Wilson, Douglas D.
B.S. 1969, Wright State University

Wilson, Stephen C.
B.S. 1969, University of Southern California

Wright, Kenneth J.
B.S. 1969, Trinity College, Conn.

Yates, Anthony P.
B.A. 1969, St. Vincent College

Yingling, Kae S.
B.S. 1969, University of Maryland

Yu, Elmer
B.A. 1968, Plymouth State College

Zarchy, Thomas M
B.S. 1969, Trinity College, Conn

FOURTH YEAR

Adams, Anthony W. — Va.
B.S. 1968, Virginia Polytechnic Institute and State University

Alarcon, Pedro A. De — Guatemala
B.A. 1968, Harvard University

Althoff, Rodger W — Ohio
B.A. 1968, Kent State University

Ammerman, Bruce J. — Md.
B.S. 1969, Case Western Reserve University

Annos, Thomas
B.A. 1968, University of Pennsylvania

Apter, Matthew N.
B.S. 1968, Trinity College, Conn.

Apter, Roy J.
B.A. 1968, University of Wisconsin, Madison

Barnard, Margaret E — Canada
B.S. 1967, Dalhousie University of Canada

Beall, Michael E. N.D.
B.A. 1968, Ohio Wesleyan University
Becker, Stuart A. N.J.
B.A. 1968, Lafayette College
Bergman, Stuart K. N.J.
B.A. 1968, University of Virginia
Binder, Marc K. Pa.
B.S. 1969, Pennsylvania State University
Bis, Kathleen A. N.J.
B.S. 1968, George Washington University
Banar, Robert A. Md.
B.S. 1968, George Washington University
Bondell, Steven P. N.Y.
B.S. 1968, City University of New York, City College
Brancaccio, Ronald R. N.Y.
B.S. 1968, Fairfield University
Brnnefield, Robert C. N.J.
B.A. 1968, Rutgers University, New Brunswick
Briggs, Charles M Va
B.A. 1965, University of Pennsylvania
Campbell, Darrell A., Jr Mich.
B.S. 1968, Michigan State University
Cerruti, Michael A Calif.
B.A. 1966, University of California, Berkeley
Chapin, Donald C. Md.
B.A. 1968, Tufts University
Cockerham, Elaine L. Mo.
B.A. 1967, Valparaiso University
Cowin, John A. N.Y.
B.A. 1968, Gettysburg College
Craft, J. Carl Utah
B.A. 1968, California Western University
Daines, Stephen P Utah
Attended Utah State University
Daly, Joseph T. Calif.
B.A. 1967, University of California, Davis
Davis, Christopher J. Calif.
B.S. 1968, Massachusetts Institute of Technology
De Figuerredo, Paul D Portugal
B.S. 1966, Stanford University
Diaz, Carlos R. Md.
B.A. 1968, Johns Hopkins University
Donaldson, Mary M. Md.
B.A. 1968, Sweet Briar College
Donohue, Dennis J. Md.
B.S. 1966, St. John's University, N.Y.
Ehrlich, Leonard D N.Y.
B.A. 1968, City University of New York, Hunter College
Eisenbaum, Allan M. N.Y.
B.A. 1969, George Washington University
Fam, Kenneth C. N.J.
B.S. 1968, Muhlenberg College
Fixler, John H. Idaho
B.S. 1968, College of Idaho
Fone, Anne Elizabeth H. Calif.
B.A. 1969, George Washington University
Fox, Sherman S. N.J.
B.A. 1968, Johns Hopkins University
Franklin, John M. Wash.
B.S. 1968, University of Washington
Georges, Britton L. Wash.
B.S. 1968, University of Washington
Gennuzzi, Vito A. N.Y.
B.S. 1968, George Washington University
Goldman, Robert L. D.C.
B.A. 1968, University of Pennsylvania
Griffiths, Richard C. Va.
B.S. 1968, Michigan State University

Helfgott, Maxwell A. Md.
B.A. 1968, Grinnell College
Helfgott, Roberta L. N.Y.
B.S. 1968, Simmons College
Hunter, Robert J. Pa.
B.A. 1968, Franklin and Marshall College
Johnson, Steele R. Wash.
B.A. 1966, University of Washington
Joseph, Raymond E. Ohio
B.S. 1968, Ohio State University
Juel, Randolph W. Wash
B.A. 1968, University of Washington
Kassan, Stuart S. N.Y.
B.A. 1968, Case Western Reserve University
Katz, Jeffrey I. N.Y.
B.A. 1968, Clark University
Katzen, Jay E. D.C.
B.A. 1967, George Washington University
Kaufman, Joseph H N.Y.
B.A. 1963, New York University
Kessler, Michael A. N.J.
B.A. 1968, Rutgers University, New Burnswick
Kiessling, Brenda R. Va
B.A. 1962, Oberlin College
M.A. in Ed. 1964, George Washington University
Kimball, Richard R Calif.
B.A. 1967, University of California, Riverside
King, Don R. Calif.
B.S. 1968, University of Redlands
King, Joy D. Wash.
B.S. 1968, University of Washington
Kirby, Richard L. Del
B.A. 1968, University of Delaware
Knudson, Homer E. Va.
B.S. 1968, Brigham Young University
Korengold, George M. Md
B.A. 1968, University of Pennsylvania
Kravitz, Paul H N.Y.
B.S. 1968, George Washington University
Krzyzkowski, Michael J. N.J.
B.S. 1968, Wagner College
Leventhal, Stuart P. N.J
B.S. 1968, University of Pittsburgh
Lichtenstein, Alan K. N.Y
B.A. 1968, City University of New York, Brooklyn College
Lichtenstein, Jacqueline W. Md.
B.A. 1967, Antioch College
Loube, Julian M. Md.
B.A. 1967, George Washington University
Macht, Steven D. Md.
B.S. 1965, D.D.S. 1969, University of Maryland
Magee, William P., Jr. N.J.
D.D.S. 1969, University of Maryland
Marion, Edward D. N.Y.
B.A. 1969, George Washington University
McCarthy, Patrick J. Md.
B.A. 1968, LaSalle College
McClenathan, James H. Md.
Attended Carnegie-Mellon University
Miyawaki, Edison H. Hawaii
M.S. 1964, Johns Hopkins University
Monteverde, Ronald P. N.Y.
B.S. 1968, St. Peter's College, N.J.
Mowery, James H. Ill.
B.A. 1968, Northwestern University
Nickens, Wayne C. D.C.
B.S. 1968, Howard University
Nierman, Robert S. Mass.
B.A. 1968, Boston University

Noble, Donald E. Md.
B.A. 1968, George Washington University
Olds, Corwin A. Calif.
B.S. 1947, U.S. Naval Academy
B.S. in M.E. 1955, M.S. in M.E. 1956, U.S. Naval Postgraduate School
Oliff, Michael N.J.
B.A. 1968, Rutgers University, New Brunswick
Orman, Ronald J. Mont.
Attended University of Montana
Parker, Frederick W., III Pa.
B.S. 1968, University of Scranton
Pearson, Michael L. Wash.
B.S. 1968, Washington State University
Peck, Dennis F Wash.
B.A. 1968, University of Washington
Pillsbury, Harold C., III Md.
Attended George Washington University
Powell, Thomas R. N.Y.
B.A. 1968, Boston University
Reff, Richard B. Md.
B.A. 1969, George Washington University
Rotstein, Martha Mass.
B.S. 1968, Simmons College
Schenk, Joseph H. Md.
B.A. 1968, LaSalle College
Scherf, Chrisman G. N.Y.
B.S. 1968, Duke University
Schulz, Robert W. Fla.
Attended George Washington University
Schweitz, Michael C. Md.
B.A. 1969, George Washington University
Seltzer, Shalom D.
Attended Tulane University of Louisiana
Shreeve, Thomas L.
B.A. 1968, Franklin and Marshall College
Sklaver, Allen R.
B.A. 1968, Williams College
Snover, Seth W.
B.S. 1968, Muhlenberg College
Sonkens, Jerry W.
B.S. 1967, Brigham Young University
Street, Thomas F.
B.S. 1968, John Carroll University
Surrey, Mark W.
B.S. 1968, University of Pittsburgh
Swensen, Laird S.
B.A. 1968, Brigham Young University
Theard, Franz C.
B.A. 1968, Catholic University of America
Thompson, Charles E., Jr.
B.A. 1968, University of Washington
Thomson, Stephen T.
B.S. 1968, Brigham Young University
Thornton, Abigail G.
B.S. 1965, M.S. 1967, George Washington University
Warchol, Richard J.
B.A. 1967, Millikin University
Winston, David H.
B.A. 1968, State University of New York at Binghamton
Zimmerman, Larry G.
B.S. 1968, Colorado State University

Summaries of Registration 1971–72

NUMBER OF REGISTRANTS

Class entering 1971	125	Class entering 1969	
Class entering 1970	111	Class entering 1968	

GEOGRAPHICAL DISTRIBUTION OF STUDENTS

Alabama	1	Michigan	
Arizona	2	Minnesota	
Arkansas	1	Mississippi	
California	39	Missouri	
Colorado	3	Montana	
Connecticut	18	Nevada	
Delaware	5	New Jersey	
District of Columbia	28	New Mexico	
Florida	6	New York	
Hawaii	2	North Carolina	
Idaho	3	North Dakota	
Illinois	4	Ohio	
Indiana	3	Oregon	
Iowa	1	Pennsylvania	
Kansas	1	Rhode Island	
Maine	2	South Carolina	
Maryland	73	Tennessee	
Massachusetts	14	Texas	

Utah	18
Virginia	14
Washington	24
West Virginia	1
Wisconsin	3
Wyoming	1
Argentina	1
Canada	2
England	1
Guatemala	1
Haiti	2
Honduras	1
Kenya	1
Liberia	1
Mexico	1
Nigeria	2
Portugal	1
West Cameroun	1

INSTITUTIONS IN WHICH SCHOOL OF MEDICINE STUDENTS EARNED DEGREES

Adelphi University	1
Alabama, University of, Tuscaloosa	1
Alfred University	2
American University	4
Amherst College	2
Antioch College	1
Arizona, University of	1
Barat College	1
Barnard College	1
Bethany College, W.Va.	1
Boston University	5
Bowdoin College	1
Brigham Young University	9
Brown University	2
Bucknell University	1
California Lutheran College	1
California State Polytechnic College, San Luis Obispo	1
California, University of:	
Berkeley	7
Davis	2
Los Angeles	4
Riverside	2
Santa Barbara	2
California Western University	1
Carnegie-Mellon University	1
Carson-Newman College	1
Case Western Reserve University	2
Catholic University of America	1
Central State University	1
Claremont Men's College	1
Clark University	3
Colby College	1
Colgate University	3
Colorado State University	1
Colorado, University of	3
Columbia Union College	1
Columbia University	3
Connecticut, University of	2
Cornell University	4
Dalhousie University, Canada	1
Dartmouth College	3
Dayton, University of	1
Delaware, University of	1
Dickinson College	4
Duke University	8
Elmira College	1
Emory University	1
Fairfield University	4
Florida Southern University	1
Florida State University	1
Florida, University of	1
Franklin and Marshall College	7
Geneva College	1
George Washington University	52
Georgetown University	5
Gettysburg College	2
Gonzaga University	1
Goucher College	1
Grinnell College	1
Hartford, University of	1
Harvard University	2
Harvey Mudd College	1
Hofstra University	4
Holy Cross, College of the	1
Hood College	1
Howard University	3
Idaho, College of	1
Illinois, University of	1
Indiana University at Bloomington	1
Iowa State University of Science and Technology	1
John Carroll University	1
Johns Hopkins University	9
Kent State University	1
Kenyon College	2
Lafayette College	4
LaSalle College	2
Lehigh University	1
London, University of, England	1
Loyola University of Los Angeles	1
Lycoming College	1
Manhattan College	1
Manhattanville College	1
Marshall University	1
Maryland, University of	10

Massachusetts Institute of Technology	2
Massachusetts, University of, Amherst	2
McGill University, Canada	1
Miami University	3
Miami, University of	2
Michigan State University	2
Michigan, University of	4
Middlebury College	1
Millikin University	1
Mills College	1
Minnesota, University of, Mineapolis-St. Paul	1
Missouri, University of, Kansas City	1
Morehouse College	1
Mount Holyoke College	2
Muhlenberg College	4
Muskingum College	2
Newark College of Engineering	1
New Mexico State University	1
New York, City University of:	
Brooklyn College	2
City College	2
Hunter College	1
New York, State University of:	
at Binghamton	1
at Buffalo	1
at Stony Brook	2
New York University	6
North Carolina Agricultural and Technical State University	1
North Carolina, University of, at Chapel Hill	1
North Dakota, University of	2
Northwestern University	5
Notre Dame, University of	1
Oberlin College	1
Ohio State University	4
Ohio Wesleyan University	2
Oregon State University	1
Oregon, University of	2
Oxford University, England	1
Pacific College	1
Pennsylvania State University	5
Pennsylvania, University of	11
Pittsburgh, University of	3
Plymouth State College	1
Princeton University	2
Randolph-Macon College	1
Redlands, University of	1
Reed College	1
Renssaelaer Polytechnic Institute	
Rhode Island, University of	
Rochester, University of	
Rutgers University, New Brunswick	
Sacramento State College	
St. Anselm's College	
St. John's University, N.Y.	
St. Lawrence University	
St. Peter's College, N.J.	
St. Vincent College	
San Diego State College	
Scranton, University of	
Simmons College	
South Carolina State College	
Southern California, University of	
Southern Illinois University	
Stanford University	
Swarthmore College	
Sweet Briar College	
Syracuse University	
Temple University	
Texas Technological University	
Trinity College, Conn.	
Trinity College, D.C.	
Tufts University	
U.S. Air Force Academy	
U.S. Military Academy	
U.S. Naval Academy	
U.S. Naval Postgraduate School	
Utah, University of	
Valparaiso University	
Vassar College	
Virginia Polytechnic Institute and State University	
Virginia, University of	
Wagner College	
Washington and Jefferson College	
Washington and Lee University	
Washington State University	
Washington University	
Washington, University of	
Wayne State University	
Weber State College	
Wellesley College	
Wesleyan University	
Whitman College	
Williams College	
Wisconsin, University of, Madison	
Wright State University	
Wyoming, University of	
Yale University	
Yeshiva University	

Number of college graduates ..... 439 Number of institutions represented 170

Recipients of the Degree of Doctor of Medicine, May 30, 1971

Name, State of Residence, Degrees Held	Internship and Residency Appointments*
Richard Lee Abbott, New York B.S. 1967, Tufts University	University of Southern California Medical Center, Los Angeles, Calif
George Adam, New York B.A. 1967, New York University	U.S. Public Health Service Hospital, Staten Island, N.Y
Stephen McCague Aldrich, Virginia B.A. 1967, Whitman College	St. Luke's Hospital, Denver, Colo.
Robert Jerry Allen, Virginia B.S. 1967, Brigham Young University	Latter-Day Saints Hospital, Salt Lake City, Utah
Wayne Allgaier, Virginia B.S. 1967, Brigham Young University	Latter-Day Saints Hospital, Salt Lake City, Utah
Terence Lee Babcock, Maryland B.S. 1967, George Washington University	U.S. Army Medical Service Hospital, Letterman General Hospital, San Francisco, Calif.
Patricia Jane Barnes, New Jersey B.A. 1966, Gettysburg College	Swedish Hospital Medical Center, Seattle, Wash.
Joseph Bronislaw Bikowski, Jr., Maryland B.A. 1967, LaSalle College	Washington Hospital Center, Washington, D.C.
William Dunbar Boyd II, Virginia B.S. 1967, University of Maryland	Washington Hospital Center, Washington, D.C.
Michael Brancaccio, District of Columbia B.S. 1967, Fairfield University	George Washington University Hospital, Washington, D.C.
George Alan Brener, Massachusetts B.A. 1967, Boston University	Boston City Hospital, Boston, Mass.
Allen Finney Browne, California B.A. 1967, Brown University	Maine Medical Center, Portland, Maine
Madonna Ann Browne, Maine B.S. 1964, Duke University M.S. 1969, George Washington University	Maine Medical Center, Portland, Maine
Roger Stevenson Brunt, Virginia B.S. 1967, Brigham Young University	Good Samaritan Hospital, Phoenix, Ariz.
Frank Joseph Bush, Jr., Massachusetts B.A. 1967, University of Maine at Orono	Strong Memorial Hospital of the University of Rochester, Rochester, N.Y.
Culley Clyde Carson III, Connecticut B.S. 1967, Trinity College, Conn.	Mary Hitchcock Memorial Hospital, Hanover, N.H.
John James Chabalko, Pennsylvania B.S. 1967, Muhlenberg College	Baltimore City Hospitals, Baltimore, Md.
Brian Lee Charlton, District of Columbia B.A. 1967, Western Maryland College	Robert Packer Hospital, Sayre, Pa.
Allan Krekeler Chrisman, Maryland B.A. 1967, Lafayette College	Washington Hospital Center, Washington, D.C.
John Leo Clark, Maryland B.A. 1967, Franklin and Marshall College	Presbyterian-University of Pittsburgh Health Center, Pittsburgh, Pa.
John Brian Cleary, Virginia B.S. 1967, Niagara University	Washington Hospital Center, Washington, D.C.
Marcia Camden-Cleveland, Virginia B.S. 1967, Parsons College	George Washington University Hospital, Washington, D.C.
Charles Alan Corr, Virginia B.A. 1967, Wesleyan University	Mary Hitchcock Memorial Hospital, Hanover, N.H.
Jack Michael Costa, New Jersey B.A. 1967, Gettysburg College	Washington Hospital Center, Washington, D.C.
Joseph Arden Crawford, Virginia B.S. in E.E. 1960, Case Western Reserve University M.S. (E.E.) 1964, Columbia University	Washington Hospital Center, Washington, D.C.
Nancy Gramch Crossland, Virginia B.S. 1967, University of Richmond	
Paul Ira Dantzig, New York David Lee Darr, New Jersey B.S. 1967, Muhlenberg College	George Washington University Hospital and D.C. General Hospital, Washington, D.C.
Francis Leo Delmonico, Maryland B.S. 1966, Mount St. Mary's College, Md.	D.C. General Hospital, Washington, D.C. †George Washington University Affiliated Hospitals, Washington, D.C.
Paul Everett Dicus, Virginia Paul Martin Fine, Maryland B.A. 1968, George Washington University	Medical College of Virginia Hospitals, Richmond, Va
Norman Howard Fitz-Henley, District of Columbia	Brooke General Hospital, San Antonio, Tex. University of Southern California Medical Center, Los Angeles, Calif.
Sidney Alan Frank, Massachusetts B.A. 1967, Bowdoin College	D.C. General Hospital, Washington, D.C.
	Children's Hospital Medical Center of Northern California, Oakland, Calif.

*Appointments listed here are Internships, except those preceded by a dagger (†), which are Residencies.

Thomas William Furlow, Jr., Maryland (With Distinction) B.A. 1968, George Washington University	Vanderbilt University Affiliated Hospitals, Nashville, Tenn.
James Streeter Gardner, New York B.S. 1967, Trinity College, Conn.	U.S. Naval Hospital, Chelsea, Mass
Steven Craig Garner, Maryland B.A. 1967, University of Massachusetts, Amherst	State University of New York, Upstate Med Center, Syracuse, N.Y.
John Paul Gens, Connecticut B.S. 1967, Trinity College, Conn.	George Washington University Hospital and D.C. General Hospital, Washington, D.C.
Jared David Gerstein, New York B.A. 1967, New York University	Walter Reed General Hospital, Washington, D.C.
Gary Ray Gibbons, Virginia B.S. 1967, Utah State University	U.S. Naval Hospital, San Diego, Calif.
Douglas William Gibson, New York B.S. 1966, Wagner College	Nassau County Medical Center, Meadowbrook Hospital, East Meadow, N.Y.
Robert J. Glowitz, Maryland B.S. 1967, University of Maryland	University of Washington Affiliated Hospitals, Seattle, Wash.
Constance Lee Goldberg, Maryland B.S. 1966, Pennsylvania State University	
Howard Seth Goldstein, New Jersey B.A. 1967, Colgate University	Boston City Hospital, Boston, Mass.
Clifford James Goodman, Jr., Arizona	†George Washington University Affiliated Hospitals, Washington, D.C.
Barry Charles Gorman, District of Columbia B.S. 1967, Tufts University	Washington Hospital Center, Washington, D.C.
Mark William Greenwood, Utah B.A. 1967, University of Utah	Latter-Day Saints Hospital, Salt Lake City, Utah
David Lawson Gregg, California B.A. 1966, Northwestern University	Boston City Hospital, Boston, Mass.
Ronald Alphonso Griffin, District of Columbia B.A. 1967, George Washington University	Baltimore City Hospitals, Baltimore, Md.
Thomas Malcolm Grogan, Maryland B.A. 1967, University of Virginia	U.S. Army Medical Service Hospital, Letterman General Hospital, San Francisco, Calif.
Michael Alan Gromet, New York B.A. 1967, New York University	Lenox Hill Hospital, New York, N.Y.
Howard Jay Gross, District of Columbia B.S. 1967, Tufts University	St. Elizabeth's Hospital of Boston, Brighton, Mass.
Jane Sharon Hanscom, Maine B.A. 1967, University of Maine at Orono	George Washington University Hospital and D.C. General Hospital, Washington, D.C.
Robert Joseph Harris, Maryland B.A. 1968, George Washington University	Presbyterian-University of Pittsburgh Health Center, Pittsburgh, Pa.
John Sanford Holmes, Virginia B.A. 1967, San Fernando Valley State College	University of Oregon Medical School Hospitals, Portland, Ore.
William Scott James, District of Columbia B.A. 1967, Johns Hopkins University	Medical Center Hospital of Vermont, Burlington, Vt.
Ronald Guy Jan, District of Columbia B.S. 1965, University of California, Berkeley M.A. 1968, San Francisco State College	San Francisco General Hospital, San Francisco, Calif.
Philip Sherwood Kline, Jr., Virginia B.A. 1965, University of Texas at Austin	University of Texas at San Antonio Teaching Hospital, San Antonio, Texas
Ronald Dale Kurstin, District of Columbia B.A. 1967, Tulane University of Louisiana	University of Minnesota Hospitals, Minneapolis, Minn.
Martin Lee, New York B.A. 1966, Columbia University	St. Paul-Ramsey Hospital, St. Paul, Minn
Arnold Glenn Levy, Maryland (With Distinction) B.A. 1968, George Washington University	Strong Memorial Hospital, Rochester, N.Y.
Edwin Peter Lojko, Virginia B.A. 1967, University of Virginia	†George Washington University Affiliated Hospitals, Washington, D.C.
John Byron McBeath, District of Columbia	University of Colorado Affiliated Hospitals, Denver, Colo.
Michael Mendelson, Virginia B.A. 1965, Long Island University, C.W. Post Center M.S. 1967, Rutgers University, New Brunswick	George Washington University Hospital, Washington, D.C.
Norman Minars, New York B.A. 1967, New York University	University of California at Los Angeles Affiliated Hospitals, Los Angeles, Calif.
Kenneth Paul Moritsugu, Hawaii B.A. 1967, University of Hawaii	U.S. Public Health Service Hospital, San Francisco, Calif.
Roger Newton, Tennessee B.A. 1967, Yale University	Kaiser Foundation Hospital, San Francisco, Calif.

David Evan Owens, Virginia B.A. 1964, Wesleyan University M.S. 1965, University of Connecticut	Washington Hospital Center, Washington, D.C.
Robert Michael Pash, Maryland B.A. 1967, Gettysburg College	University of Colorado Affiliated Hospitals, Denver, Colo. George Washington University Hospital and D.C. General Hospital, Washington, D.C.
Stephen Donohoe Pett, Virginia (With Distinction) B.S. 1967, Seton Hall University	George Washington University Hospital, Washington, D.C. Rhode Island Hospital, Providence, R.I.
Norman Odell Polk, District of Columbia B.A. 1967, Harvard University	New England Medical Center Hospitals, Boston, Mass. George Washington University Hospital and D.C. General Hospital, Washington, D.C. Greenwich Hospital, Greenwich, Conn.
Anthony Ralph Potenza, District of Columbia B.S. 1967, University of Pittsburgh	
Robert Daniel Pugatch, New York B.A. 1967, Johns Hopkins University	Veterans Administration Hospital (Jamaica Plain), Boston, Mass. University of Wisconsin Hospitals, Madison, Wis. Duke University Medical Center, Durham, N.C.
Edward Carlisle Rainey II, Virginia B.S. 1967, George Washington University	
Barry Sterling Reed, Washington B.A. 1967, University of Washington	Presbyterian-University of Pittsburgh Health Center, Pittsburgh, Pa. Temple University Hospital, Philadelphia, Pa.
Richard Alan Rein, Maryland B.A. 1967, University of Rochester	
Gerald Lewis Reisman, Ohio B.S. 1967, University of Michigan	Montefiore Hospital, Pittsburgh, Pa.
Bruce D. Romig, Virginia B.S. 1967, Duke University	Children's Hospital, Washington, D.C.
Robert Lawrence Rosenberg, New Jersey B.A. 1968, George Washington University	University of New Mexico Affiliated Hospitals, Albuquerque, N.M. New York Medical College, Metropolitan Hospital Center, New York, N.Y. Maimonides Medical Center, Brooklyn, N.Y.
David Bennett Ross, New York B.S. 1967, Cornell University	
Richard Stanley Ruben, Pennsylvania B.S. 1967, Northwestern University	Washington Hospital Center, Washington, D.C.
Steven Anthony Schlachter, Maryland B.S. 1967, St. Peter's College, N.J.	Beth Israel Hospital, New York, N.Y.
Malinda Marion Schramm, New Jersey B.S. 1967, Wheaton College, Ill.	St. Barnabas Medical Center, Livingston, N.J.
Brian Martin Schulman, New York B.A. 1968, George Washington University	University of Colorado Medical Center, Denver, Colo. Philadelphia General Hospital, Philadelphia, Pa. George Washington University Hospital and D.C. General Hospital, Washington, D.C. Beth Israel Hospital, New York, N.Y.
Susan Kuhr Schulman, New York B.A. 1967, Yeshiva University	
Verna Elizabeth Schultz, Maryland B.A. 1968, George Washington University	
Leslie Alan Shapiro, New York B.A. 1967, New York University	North Shore Hospital, Long Island, N.Y.
Howard Neil Smith, Maryland B.S. 1967, St. Peter's College, Md.	University of Miami Affiliated Hospitals, Miami, Fla. University of Miami Affiliated Hospitals, Miami, Fla.
David Dean Sonne, Maryland B.S. 1968, University of Utah	
Robert Harvey Spector, New York B.A. 1967, Franklin and Marshall College	Vanderbilt University Affiliated Hospitals, Nashville, Tenn.
Roger James Starkweather, Virginia B.A. 1967, Northwestern University	George Washington University Hospital and D.C. General Hospital, Washington, D.C. Presbyterian-St. Luke's Hospital, Chicago, Ill.
Barry Leslie Strauss, New York B.A. 1967, Cornell University	
Edwin Chit-Sang Tan, Maryland B.S. 1967, Mount Union College	Peter Bent Brigham Hospital, Boston, Mass.
Jeffrey George Tardiff, New Jersey B.A. 1968, St. Michael's College	
Paul Tauber, Maryland B.A. 1967, City University of New York, Brooklyn College	George Washington University Hospital and D.C. General Hospital, Washington, D.C. Maine Medical Center, Portland, Maine
Barbara Burlason Travis, Maryland (With Distinction) B.A. 1967, Bryn Mawr College	
James Richard Ungar, Virginia B.A. 1967, George Washington University	
Carlos Orlando Urrutia-S., District of Columbia B.S. 1966, Georgetown University	
Stephen Henry Van Devanter, Maryland (With Distinction) B.A. 1968, George Washington University	
Robert Stephen Viener, Maryland B.A. 1967, University of Pennsylvania	
Albert James Watt, Virginia B.A. 1967, Brown University	

Richard William Weiss, New York B.A. 1966, Cornell University	Albert Einstein Medical Center, Philadelphia, Pa.
Richard James Whitley, New Jersey B.A. 1967, Duke University	University of Alabama Medical Center, Birmingham, Ala.
Roger Smith Woodward, Maryland B.A. 1966, Stanford University	William A. Shands Teaching Hospital, Gainesville, Fla.
Larry Yip, Washington B.S. 1967, University of Washington	Washington Hospital Center, Washington, D.C.
Paul Timothy Yoder, Virginia B.S. 1967, Eastern Mennonite College	York Hospital, York, Pa
John Joseph Zieminski, New Jersey B.S. 1967, Fordham University	Albany Medical Center, Albany, N.Y



ALUMNI AND ALLIED ASSOCIATIONS

HE GENERAL ALUMNI ASSOCIATION

HE OBJECTIVES OF THIS ASSOCIATION are to unite graduates who wish to associ-
te themselves for charitable, educational, literary, and scientific purposes, and
promote the general welfare of the University.
Eligible members are those who have matriculated in any school of the Uni-
ersity and left the University in good standing, or any person who is or has
een a member of the teaching, research, or administrative staff of the Univer-
ity, or of the Board of Trustees of the University. Active members are those
ligible members who are current contributors (dues or otherwise) to or life
embers of the George Washington University General Alumni Association,
e Alumni Association of any school of the University, or contributors to the
nnual Support Program.
The Alumni Office is in Bacon Hall, 2000 H Street, N.W., Washington, D.C.
006. All alumni are urged to keep the Alumni Office informed of changes of
ddress or occupation and to supply information with regard to their fellow
umni.

HE GEORGE WASHINGTON UNIVERSITY MEDICAL ALUMNI ASSOCIATION

e George Washington University Medical Alumni Association, incorporated
1959, continues the organization previously known as the George Washing-
University Medical Society.
The stated purposes of the Association are as follows: "This shall be a non-
fit organization international in scope, whose objectives shall be to provide
structive services for the alumni of the George Washington University
ool of Medicine, for furthering the art and science of medicine, research,
for the promotion of the welfare of the George Washington University
ool of Medicine, its students, the George Washington University Hospital
its trainees."
ctive membership in the Association consists of all graduates of the School
Medicine; current members and, on application, past members of the teach-
staff of the School of Medicine who hold doctoral degrees; Doctors of
dicine who have had one or more years of postgraduate training in the
rge Washington University Hospital. Junior membership consists of all
mbers of the student body of the School of Medicine during the time they
tudents.

The Medical Alumni Association maintains an office in the School of Medicine at 1331 H Street, N.W., Washington, D.C. 20005.

OFFICERS FOR 1971–72

President—Marvin P. Footer, B.A. 1938, M.D. 1942
First Vice President—Donald H. Glew, M.D. 1948
Second Vice President—John F. Mermel, M.D. 1960
Secretary—Carlos A. Silva, M.D. 1960
Treasurer—Burton S. Epstein, M.A. 1954, M.D. 1957
Council:

Jerome W. Canter, M.D. 1955
Jerome H. Epstein, B.A. 1948, M.D. 1953
Maurice T. Gromet, B.A. 1931, M.D. 1934
Richard I. Kilstein, B.A. 1931, M.D. 1934
Jack B. Kleh, B.A. 1942, M.D. 1944
Kent A. Peterson, B.A. 1956, M.D. 1959
Morris Rosenberg, B.A. 1938, M.D. 1941
George Speck, M.D. 1941
Eric Wagshal, B.A. 1967, M.D. 1970
Allan Zellis, M.D. 1941



APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety on the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property, or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 19, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs of The George Washington University as soon after order is restored as is practicably possible.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its traditional commitment to freedom of expression (a) by continuing to permit business and government organizations which are recruiting employees to conduct their activities at designated places on campus, and (b) by placing no obstacle to students who may wish to protest the presence of such recruiters, provided, however, that such protest shall be orderly and shall not impede or disrupt the recruiter in his activities.

The University affirms its place as a forum for the free exchange of ide
(a) by assuring that guests invited to speak on this campus at duly schedul
meetings shall have the right to appear and to be heard, and (b) by sanctio
ing the freedom of students to express dissent from the views of the speake
provided, however, that that expression of dissent be orderly and nonobstru
tive.

The University distinguishes between orderly protest and resistance-by-o
struction; it accepts the former as a legitimate expression of dissent while r
jecting the latter as an abridgement of the freedoms of the individuals wh
may be its object.

**The following was approved by the University's Board of Trustees on Octob
19, 1968:**

The George Washington University is opposed to discrimination based o
race, color, or creed. Such discrimination may have appeared in campu
organizations in the past. In the future, however, no organization can be recog
nized or supported by the University unless it provides continued assurance o
nondiscrimination in membership practices and in intent, considered adequat
by relevant committees and officers of the University.

**The following was approved by the University's Board of Trustees on Octob
19, 1968:**

The University cannot condone violations of law, including violation o
those laws which proscribe possession, use, sale, or distribution of certain dru
Members of the academic community should know that administrative actio
which may include dismissal from the residence halls, revocation of oth
privileges, or suspension or dismissal from the University, may be taken
order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and t
Faculty to continue to implement this policy.

**The following resolution, submitted by the University Senate, was approved
the University's Board of Trustees on January 16, 1969:**

Be it resolved by the Senate of The George Washington University: A
member of the University (including as members of the University all perso
having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, researc
and learning, or

(b) who unreasonably obstructs free access to members or guests of th
University or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of th
University,

may be punished for his conduct by dismissal from the University, or by s
lesser disciplinary action, through procedures established within the Univers
for the government of its members.

In order to insure due process, any student subject to dismissal or oth
disciplinary action on the grounds of violating any of the premises of this
resolution shall have, at his discretion, the right of review of the action by t
University Hearing Committee on Student Affairs.

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NATIONAL LAW CENTER, Dean of the Center

SCHOOL OF ENGINEERING AND APPLIED SCIENCE, Dean of the School

UNDERGRADUATE AND GRADUATE CATALOGUE (Arts and Sciences, Education, Government and Business Administration, Public and International Affairs), Office of Admissions

SCHOOL OF MEDICINE, Admissions Office, School of Medicine

SUMMER SESSIONS, Dean of the Summer Sessions

SCHEDULE OF CLASSES: FALL AND SPRING SEMESTERS, Registrar

SCHEDULE OF CLASSES: SUMMER SESSIONS, Dean of the Summer Sessions

COLLEGES AND SCHOOLS—DEGREE PROGRAMS

COLUMBIAN COLLEGE OF ARTS AND SCIENCES: Associate in Arts (A.A.), Associate in Arts in General Studies (A.A. in Gen.Std.), Bachelor of Arts (B.A.), Bachelor of General Studies (B.Gen.Std.), Bachelor of Science (B.S.), Bachelor of Science in Environmental Health (B.S. in Env.Health), Bachelor of Science in Geodetic and Cartographic Science (B.S. in Geod. and Cart.Sc.), Bachelor of Science in Medical Technology (B.S. in Med.Tech.), and Bachelor of Science in Oceanography (B.S. in Ocea.)

GRADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master of Arts in Special Studies (M.A. in Sp.Std.), Master of Fine Arts (M.F.A.), Master of Music (Mus.M.), Master of Science (M.S.), Master of Science for Teachers (M.S. for Teachers), Master of Science in Forensic Science (M.S. in Forens.S.), Master of Science in Special Studies (M.S. in Sp.Std.), Master of Science in Special Studies (Oral Biology) (M.S. in Sp.Std. (Or.B.)), and Doctor of Philosophy (Ph.D.)

SCHOOL OF MEDICINE: Doctor of Medicine (M.D.)

NATIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Master of Comparative Law (M.Comp.L.), Master of Comparative Law (American Practice) (M.Comp.L.(Am.Prac.)), and Doctor of Juridical Science (S.J.D.)

SCHOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil Engineering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) (B.S. (E.E.)), Bachelor of Science (Mechanical Engineering) (B.S. (M.E.)), Master of Engineering Administration (M.E.A.), Master of Science (M.S.), and Doctor of Science (D.Sc.)

SCHOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.), Bachelor of Science in Physical Education (B.S. in P.E.), Master of Arts in Education (M.A. in Ed.), Master of Arts in Teaching (M.A.T.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Business Administration (B.B.A.), Bachelor of Science in Administration (B.S. in Adm.), Master of Arts in Government (M.A. in Govt.), Master of Arts in Health Care Administration (M.A. in H.C.A.), Master of Business Administration (M.B.A.), Master of Public Administration (M.P.A.), Master of Science in Administration (M.S. in Adm.), Master of Urban and Regional Planning (M. of Urb. and Reg.Plan.), Post-Master's Graduate Certificate in Health Care Administration (Grad.Cert. in H.C.A.), Doctor of Business Administration (D.B.A.), and Doctor of Public Administration (D.P.A.)

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A.), Master of Arts (M.A.), and Master of Science in International Affairs (M.S. in I.A.)

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THE GEORGE WASHINGTON UNIVERSITY

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THE GRADUATE SCHOOL OF ARTS AND SCIENCES, 1893

THE SCHOOL OF MEDICINE, 1825

THE NATIONAL LAW CENTER, 1865

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE, 1884

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THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION, 1928

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS, 1928

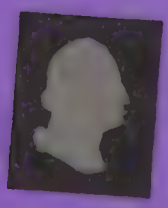
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THE SUMMER SESSIONS, 1916

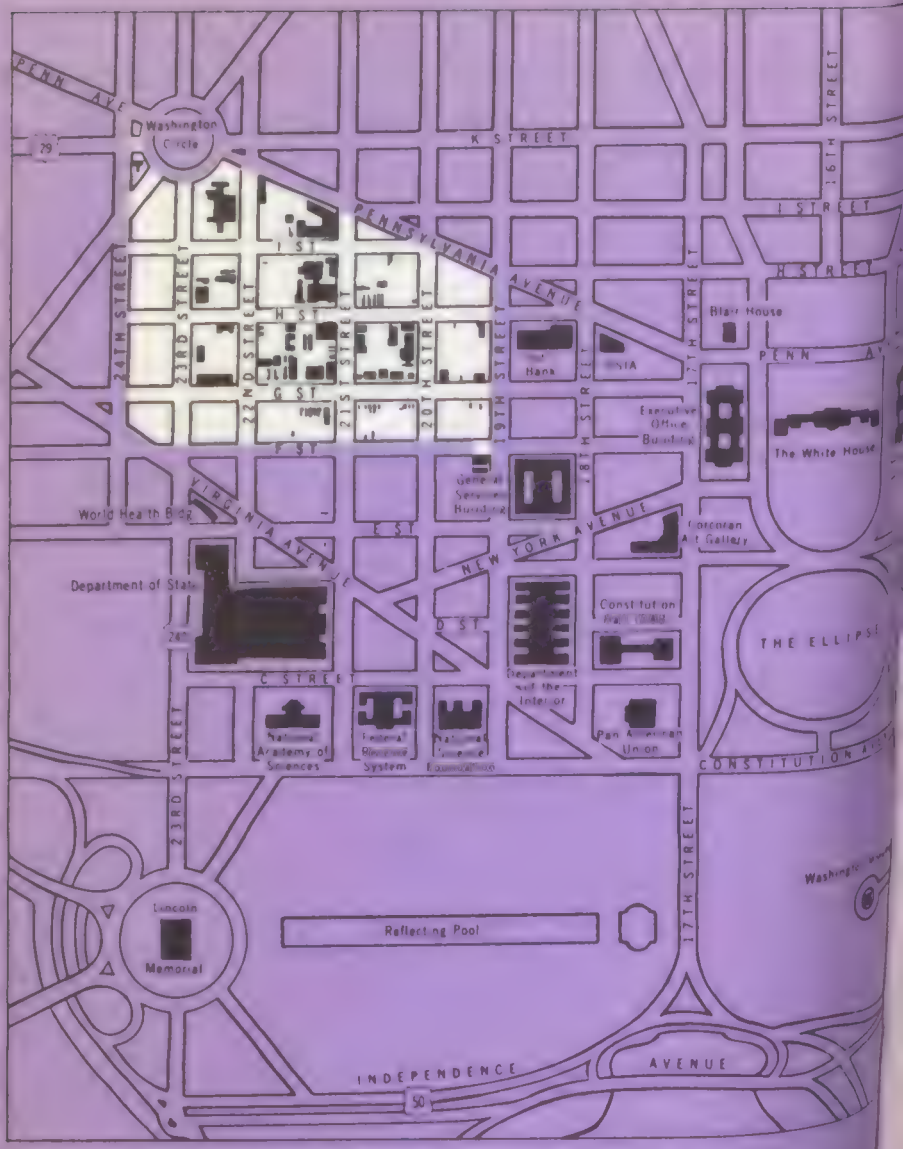
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NATIONAL
LAW
CENTER

1972-1973



/ WASHINGTON, D.C.

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THE NATIONAL LAW CENTER

1972–1973

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1972

SEPTEMBER

S	M	T	W	T	F	S
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1973

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1972 SUMMER TERM

June 5	Registration for all sessions (12 am–7 pm) *Monday* Application for September 30 graduation due as part of registration
June 6	First-session and 13-week session classes begin *Tuesday*
July 4	Holiday *Tuesday*
July 14	First-session classes end *Friday*
**July 17–19*	First-session examination period *Monday–Wednesday*
July 20	Registration for students attending 2d session only (3–7 pm) *Thursday*
July 21	Second-session classes begin *Friday* Application for September 30 graduation due as part of registration
August 30	Last day of classes *Wednesday*
August 31–September 2	Second-session and 13-week session examination period *Thursday–Saturday*

* Courses in the 13-week session will meet on their regularly scheduled days during the week of July 17.

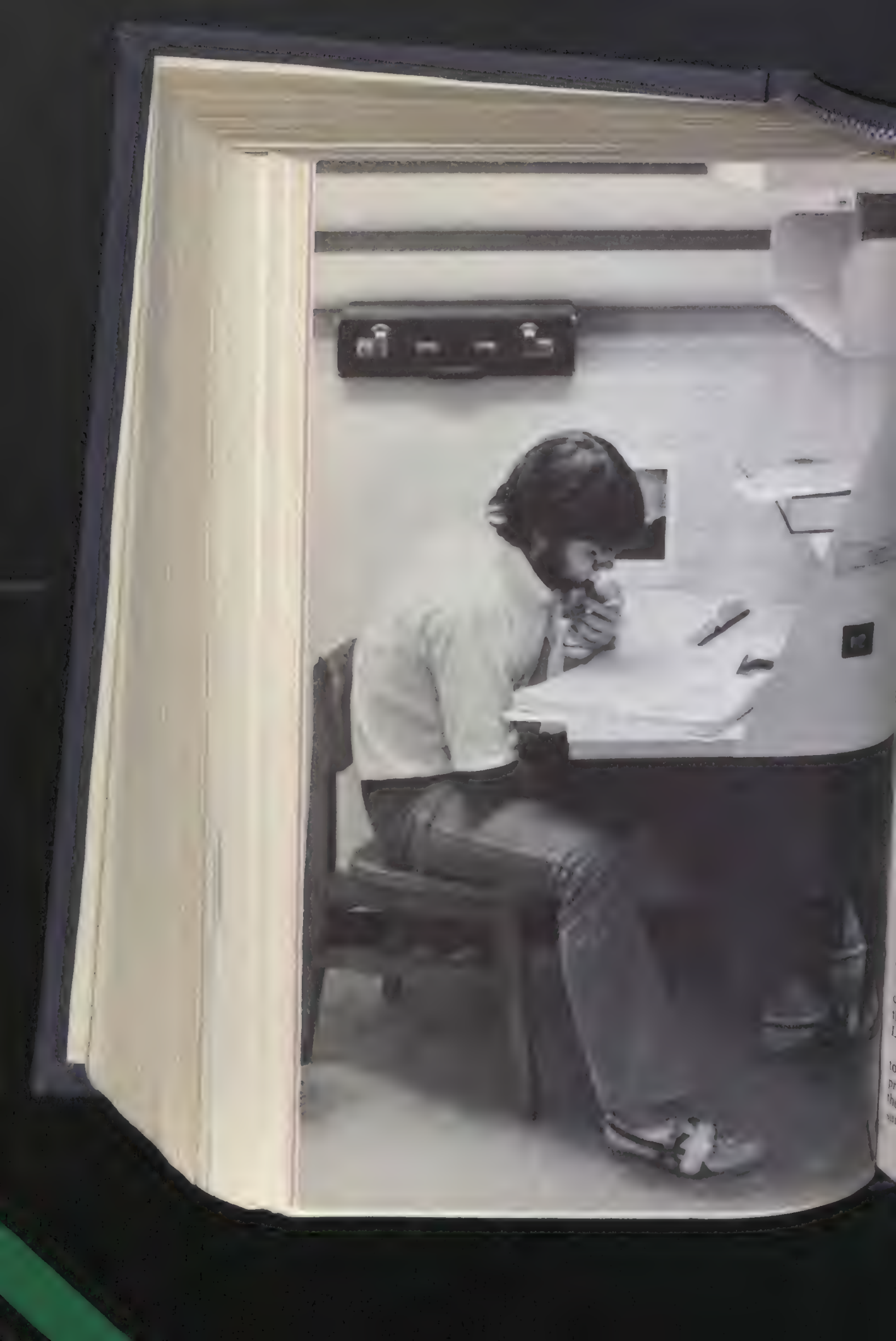
1972–73 FALL SEMESTER

September 5–6 Registration *Tuesday* (10 am–7 pm)—*Wednesday* (3–7 pm)
Only students whose last names begin with A through K may register between 10 am and 1 pm Tuesday; only students whose last names begin with L through Z may register between 1 and 4 pm Tuesday. All students may register between 4 and 7 pm Tuesday and on Wednesday
Application for February graduation due as part of registration
September 7 Classes begin *Thursday*
October 6 S.J.D. dissertations of February candidates due *Friday*
November 22 Thanksgiving recess begins after last class *Wednesday*
November 27 Classes resume *Monday*
December 16 Last day of fall-semester classes *Saturday*
January 2 LL.M. theses of February candidates due *Tuesday*
January 3–13 Examination period *Wednesday–Saturday*

1973 SPRING SEMESTER

**January 17–18* Registration *Wednesday–Thursday*
Application for June graduation due as part of registration
January 20 Inauguration Day (holiday) *Saturday*
January 22 Classes begin *Monday*
February 2 S.J.D. dissertations of June candidates due *Friday*
February 19 Winter Convocation (holiday) *Monday*
March 12 Application for 1973–74 teaching fellowships due *Monday*
March 24 Spring recess begins after last class *Saturday*
April 2 Classes resume *Monday*
April 30 LL.M. theses of June candidates due *Monday*
May 4 Last day of spring-semester classes *Friday*
May 5–26 Examination period *Saturday–Saturday*
May 28 Memorial Day (holiday) *Monday*
June 3 Commencement *Sunday*

* of registration to be announced.



THE NATIONAL LAW CENTER

HISTORY

THE LAW CENTER, the oldest law school in the District of Columbia, was established in 1865 with a formal program of two years of study. This was largely through the efforts of the Reverend George Whitefield Samson, President of Columbian College, whose action resulted in the purchase of a separate building for holding law classes. The building had belonged to Trinity Church, of which Francis Scott Key had been Senior Warden. It was occupied by the Law Center until 1884.

Sixty graduates, from twenty-two of the then thirty-seven states, received degrees in 1867. The school continued to have a student body and a faculty which reflected the fact that it was at the seat of our nation's government. Associate Justices David J. Brewer and John Marshall Harlan of the Supreme Court of the United States were among the prominent members of the bench and bar who were on the faculty.

In 1877, one year after the first such program was adopted in the United States, the Law Center instituted a course leading to the degree of Master of Laws. In 1898, the course of instruction for the degree of Bachelor of Laws was extended to three years. The Law Center took part in 1900 in the organization of the Association of American Law Schools.

In the past quarter-century the Law Center expanded its course and seminar offerings with consideration of the needs of first-degree and graduate students. The degree of Doctor of Juridical Science was instituted in 1940. The need of foreign lawyers who came to this country and who required additional preparation for law work in the United States resulted in the creation of programs for the degrees of Master of Comparative Law in 1946 and Master of Comparative Law (American Practice) in 1951.

In 1954, National University School of Law, which had an important place n legal education in the District of Columbia since 1869, was absorbed by the eorge Washington University Law School.

Since 1954, programs of special research and study have enriched the basic rriculum. These include the Institute of Law, Psychiatry, and Criminology; e Computers-in-Law Institute; the Government Contracts Program; and the w, Science, and Technology Program.

Additionally, the Law Center has been a leader in developing a curriculum meet the legal needs of the poor and the disadvantaged. A clinical law gram has been developed which is the equal of that at any law school in nation. Special projects include the Community Legal Clinic, the Consumer Protection Center, the George Washington Legal Aid Bureau, the Stu-

dents-in-Court Program, the Public Defender Project, the U.S. Attorney Assistance Program, and individual projects supervised by the Law Students Civil Rights Research Council.

Realizing the need for legal services for all members of society, the National Law Center, while maintaining its strong course offerings in patent law, administrative law, and corporate law, has developed a rich selection of courses in poverty law covering housing, sales, civil rights, and welfare.

Alumni of the National Law Center have included United States Senators, Congressmen, Ambassadors, and Cabinet Members. Its graduates have gone on to become members of both the federal and state judiciaries as well as noted members of the bar of every state in the union.

LOCATION IN THE NATION'S CAPITAL

Of special significance is the location of the National Law Center in the Nation's Capital, the focal point of the law in action, both American and international. The work of the Center goes on in this environment, presenting a unique opportunity for observation and study of federal agencies—judicial, legislative, and administrative. Readily accessible are the Supreme Court of the United States, the federal trial and appellate courts of the District of Columbia, and, in addition, federal courts of special jurisdiction, such as the United States Court of Claims, the United States Court of Customs and Patent Appeals, the Tax Court of the United States, and the Court of Military Appeals. Current federal legislation can be studied as it is considered by Congressional committees and as it comes up for debate on the floors of the House of Representatives and the Senate. With respect to the federal administrative agencies, students here in Washington have matchless opportunities for study and observation. They can attend informal and formal hearings of these agencies and can obtain from the docket sections complete records of administrative adjudication in specific cases. Illustrative of such federal agencies are the Interstate Commerce Commission and the Civil Aeronautics Board in the field of transportation; the Federal Trade Commission in the field of trade regulation; the Securities and Exchange Commission in the field of security issues and corporate finance; the National Labor Relations Board in the field of labor-management relations; the United States Patent Office in the field of patent law; the Federal Power Commission in the field of water, natural gas, and electric power; and the Federal Communications Commission in the field of radio and television.

Supplementing these environmental advantages of law in action are the exceptional research library collections in the Library of Congress, in the various departments of the federal government, and in the libraries of the headquarters of national and international organizations. The notable library of the Carnegie Foundation for International Peace has been acquired by George Washington University for use of research students in international and comparative law fields with respect to which Washington has come to be called "The Capital of the World."

The years of residence at law school are years of participation in the life of the community, which in the case of the George Washington University National Law Center is the government of the United States. As a consequence the study of law takes on added meaning, whether the goal be government service or practice, general or specialized, and whatever the community in which the student plans to practice.

OBJECTIVES

The purpose of the National Law Center is to prepare men and women to meet the needs of society in many fields of law. As a national law school, the Center does not emphasize any particular geographic area in its instruction; therefore, it prepares students to practice law in any part of the country. The Center also offers a program of legal education for foreign students. The Law Center seeks to fulfill these objectives through (1) a rich and varied curriculum taught by eminent professors and highly qualified specialized instructors, including a former Commissioner of the Internal Revenue Service and a former Chairman of the Securities and Exchange Commission; (2) an extensive clinical law program where students learn legal skills by actual practice; (3) two law journals which specialize in public law and international law; (4) actual trial practice; (5) participation in the Van Vleck Appellate Case Club (a moot court competition, in which last year's National Moot Court Team won the regional championship in competition with eight law schools in this area); (6) a series of student professional co-curricular activities; (7) studies on an advanced level for foreign as well as for American students; and (8) a continuing legal education program for members of the bar.

THE NATIONAL LAW CENTER COMPLEX

The National Law Center Complex consists of four buildings: Stockton Hall, Bacon Hall, Harlan-Brewer House, and the Jacob Burns Law Library.

STOCKTON HALL

Stockton Hall is the main classroom building. It also holds faculty offices and the offices of the Dean and the Associate Deans of the Law Center, as well as the Records Office and student lounges.

BACON HALL

Bacon Hall houses faculty offices; the *George Washington Law Review* Office; the Institute of Law, Psychiatry, and Criminology; the Government Contracts Program; the Computers-in-Law Institute; the Community Legal Clinic; the Admissions Office; the Law Center Placement Office; and the Law Alumni Office.

HARLAN-BREWER HOUSE

Harlan-Brewer House is a four-story townhouse which is used exclusively for student organizations. It houses the offices of the *Journal of International Law and Economics;* the Black Law Students of America; the Law Students Civil Rights Research Council; the Van Vleck Appellate Case Club; the *Advocate,* law school newspaper; the Student Bar Association; the Consumer Protection Center; the Legal Aid Bureau; the Draft Counseling Center; and La Raza, national Chicano law students association.

THE JACOB BURNS LAW LIBRARY

The Law Library of substantially over 125,000 volumes is housed in the mod-

ern Jacob Burns Law Library Building, adjoining Stockton Hall on the south side. This facility, opened for use on October 1, 1967, comprises nine floor and deck levels with about 49,000 square feet of floor space. Its shelf capacity



Harlan-Brewer House

now in place will accommodate over 170,000 volumes; with supplementary shelving in Stockton Hall and a small branch for the *Law Review* in Bacon Hall, the library provides space for almost 200,000 volumes. Seating for more than 450 readers is provided in four reading rooms, lounge and smoking areas, carrels, enclosed study cubicles, semi-private reading alcoves, and seminar rooms. Three photocopy machines are provided for reader use.

The collections comprise a comprehensive working library of Anglo-American law, with supplementary material in disciplines peripheral to law (such as business, finance, labor relations, sociology, criminology, political science, biography, foreign affairs, and others). Special areas are maintained for collections in tax law, labor law, patent-trademark-copyright law, international law, and foreign and comparative law. Included in the collections are the appellate decisions of all state courts and decisions of the federal courts, with comprehensive collections of English and Canadian court decisions; the currently annotated statutes of the 50 states; all federal statutes; English and Canadian statutes; selected statutes of other nations; and an extensive periodical collection, kept current by more than 850 subscriptions, covering virtually all American legal periodicals and most of those published in English throughout the world. The library is strong in its treatise holdings, administrative and regulatory materials, and Congressional coverage. The growing international law holdings include virtually complete collections of United Nations printed material and that of the European Economic Community, all recent material from the International Labor Organization, and current and retrospective collections of international treaties. A large portion of the holdings of the former library of the Carnegie Endowment for International Peace, acquired by the University in 1950, are in the Law Library.

The Juris Doctor Degree Program

ENTRANCE REQUIREMENTS

r information on "Application for Admission" to the Juris Doctor degree gram, see page 28. Admission to candidacy for the degree of Juris Doctor uires a Bachelor of Arts or equivalent degree from an accredited college or versity, a satisfactory quality of work, and an acceptable distribution of ses. Any substantial number of hours taken on a pass-fail or other unbasis may be seriously detrimental to an applicant's chances for admission. Eligibility is based on personal and scholastic records and on the results of the Law School Admission Test. No applicant will be acceptable in fer who is ineligible to return in good standing to a previously attended chool. From the applicants, a selection is made by the Committee on ssions.

ormation concerning the Law School Admission Test may be obtained the Dean of the National Law Center or from the Educational Testing e, 20 Nassau Street, Princeton, N.J. 08540; or 1947 Center Street, Berkelif. 94704. The test is administered at various centers in the United It is anticipated that the testing dates for 1972–73 will be in October, ber, February, April, and July. Completed application blanks and fees e received by the Educational Testing Service at least two weeks before

the date of the test. It is not necessary that formal application for admissi be made prior to taking the test.

ADVANCED STANDING

In unusual circumstances, advanced standing toward the degree of Juris Doct may be granted for work of high quality successfully completed in other la schools which are members of the Association of American Law Schools are approved by the American Bar Association. Transferred credits will n be recognized in excess of those which might be earned in a similar period the National Law Center.

Advanced standing will not be granted for law work already counted towar the Bachelor of Arts or other pre-legal degree.

TUITION DEPOSIT

Every student admitted to the National Law Center as a candidate for the de gree of Juris Doctor must submit a tuition deposit after receipt of notificatio of acceptance. This deposit is credited toward tuition and is refundable on in cases of applicants called into military service.

PROFILE OF THE CLASS ENTERING IN THE FALL SEMESTER 1971–72

A first-year class of 400 students was selected from 5,000 applicants from 6 colleges and universities. Applications were received from every state in th union. Twenty-six per cent of the first-year class were women; eleven per cen were students from minority groups.

GEOGRAPHICAL DISTRIBUTION OF STUDENTS

Alaska	1	Missouri	
Alabama	3	Nebraska	
California	13	Nevada	
Colorado	1	New Hampshire	
Connecticut	8	New Jersey	
District of Columbia	31	New York	
Delaware	2	North Carolina	
Florida	9	North Dakota	
Georgia	8	Ohio	
Hawaii	2	Oklahoma	
Idaho	1	Oregon	
Illinois	11	Pennsylvania	
Indiana	1	Rhode Island	
Iowa	4	Tennessee	
Kentucky	2	Texas	
Louisiana	3	Utah	
Maine	1	Vermont	
Maryland	47	Virginia	
Massachusetts	19	Washington	
Michigan	8	West Virginia	
Minnesota	4	Wisconsin	
Mississippi	5		

INSTITUTIONS IN WHICH STUDENTS EARNED DEGREES

American University	7
Amherst College	2
Barnard College	3
Boston College	2
Brown University	5
California, University of:	
Berkeley	3
Los Angeles	3
Case Western Reserve University	3
Chicago, University of	2
Colgate University	2
Columbia University	6
Cornell University	8
Dartmouth College	4
Dickinson College	3
Drexel University	3
Duke University	7
Fordham University	3
Franklin and Marshall College	2
George Washington University	34
Georgetown University	9
Goucher College	2
Harvard University	10
Hofstra University	2
Holy Cross, College of the	4
Howard University	7
Illinois, University of	4
Iowa State University of Science and Technology	4
Iowa, University of	2
Johns Hopkins University	7
Lehigh University	4
Lincoln University, Pa.	2
Marquette University	2
Maryland, University of	10
Massachusetts Institute of Technology	2
Massachusetts, University of, Amherst	2
Michigan, University of	5
Middlebury College	3
Missouri, University of, Columbia	4
Morgan State College	3
New York, State University of:	
at Albany	2
at Buffalo	2
New York University	9
North Carolina, University of, at Chapel Hill	2
Northwestern University	6
Oberlin College	2
Oklahoma, University of	2
Pennsylvania State University	11
Pennsylvania, University of	14
Pittsburgh, University of	4
Princeton University	6
Radcliffe College	2
Rutgers University, New Brunswick	2
Smith College	5
South Carolina, University of	2
Stanford University	5
Sweet Briar College	3
Syracuse University	6
Tulane University of Louisiana	2
U.S. Air Force Academy	2
U.S. Coast Guard Academy	3
U.S. Military Academy	3
U.S. Naval Academy	3
Utah, University of	2
Vassar College	2
Virginia Polytechnic Institute and State University	3
Virginia, University of	3
Washington and Lee University	2
Washington University	5
Washington, University of	5
Wellesley College	3
Wesleyan University	2
Wisconsin, University of, Madison	2
Yale University	5

The following colleges and universities are each represented by one member the first-year class: Alaska Methodist University; Alfred University; Alleeny College; Beaver College, Bethune-Cookman College; Boston University; andeis University; Brigham Young University; Byrn Mawr College; Buckll University; Canisus College; Central College, Iowa; City University of w York, Brooklyn College; City University of New York, City College; rk College, Mass.; Clarion State College; Cooper Union; Delaware State llege; Dennison University; Duquesne University; Emory University; Fedl City College; Fisk University; Florida State University; Gettysburg Col-; Hamilton College; Hollins College; Illinois Institute of Technology; Ina University; Jackson State College; Kenyon College; Loras College; Mount Mary's College, Md.; Mount Union College; North Carolina Agricultural Technical State University; North Carolina State University at Raleigh;

Ohio University; Purdue University; Regis College, Colo.; Rice Universi Roanoke College; San Fernando Valley State College; Sarah Lawrence Colle St. Anselms College; St. Joseph's College, Pa.; St. Mary's College, Ind.; Sh University; Somona State College; South Carolina State College; State Univ sity of New York at Binghamton; Swarthmore College; Tarkio Colle Temple University; Tougaloo College; Tufts University; University of Akr University of Alabama; University of Cincinnati; University of Dayton; U versity of Kansas; University of Kentucky; University of Minnesota, M neapolis-St. Paul; University of Nevada; University of Puerto Rico; Univers of Southwestern Louisiana; University of the South; University of Tampa; U versity of Texas at Austin; University of Texas at El Paso; Vanderbilt Unive sity; Virginia Union University; Washington and Jefferson College; Washin ton College; Western Michigan University; Willamette University; Wilso College.

THE CURRICULUM

The curriculum for the degree of Juris Doctor at the National Law Cent offers the candidate one of the largest and most varied selections of cours in the country. The first-year student is required to take courses in Civil Pr cedure, Constitutional Law, Contracts, Criminal Law and Procedure, Legal R search and Writing, Property, and Torts. These courses give the student th basis upon which all further legal study is built. In the second and third year of study, the student must take Evidence and fulfill a two-credit legal writing requirement. Beyond these requirements the student is free to choose fro the many course and project offerings. The Law Center prides itself on allow ing the student freedom to design his own program of study.

The curriculum is organized so that students may begin the study of law f the Juris Doctor degree only at the start of the fall semester. Transfer student may enter at the start of the spring semester also.



DAY DIVISION

First Year

FALL SEMESTER		SPRING SEMESTER	
Contracts I	4	Contracts II	2
Torts	4	Property	4
Criminal Law and Procedure	4	Constitutional Law	4
Legal Research and Writing	2	Civil Procedure	4
Total semester hours	14	Total semester hours	14

Second Year

FALL SEMESTER		SPRING SEMESTER	
Elective	14	Evidence	4
		Elective	10
Total semester hours	14	Total semester hours	14

Third Year

FALL SEMESTER		SPRING SEMESTER	
Elective	12	Elective	14
[a]Legal writing requirement	2		
Total semester hours	14	Total semester hours	14

EVENING DIVISION

First Year

FALL SEMESTER		SPRING SEMESTER	
Contracts I	4	Contracts II	2
Torts	4	Criminal Law and Procedure	4
Legal Research and Writing	2	Civil Procedure	4
Total semester hours	10	Total semester hours	10

Second Year

FALL SEMESTER		SPRING SEMESTER	
Property	4	Constitutional Law	4
Elective	6	Elective	6
Total semester hours	10	Total semester hours	10

[a] This requirement may be satisfied by service on the *Law Review*, by satisfactory completion of a seminar which requires a research paper, or by satisfactory completion of Law 344, *Legal Writing*.

Third Year

FALL SEMESTER		SPRING SEMESTER	
Elective	8	Evidence	
*Legal writing requirement	2	Elective	
Total semester hours	10	Total semester hours	

Fourth Year

FALL SEMESTER		SPRING SEMESTER	
Elective	10	Elective	
Total semester hours	10	Total semester hours	

Summer Term or Ninth Semester

Elective	4

REQUIREMENTS FOR THE DEGREE

The student must have completed a residence period of three academic years (four years for evening students) and 84 semester hours of required and elective courses, with a cumulative average of at least 65. At least one academic year of residence and 28 semester hours are required of students admitted with advanced standing. The work of the final semester or summer session must be completed while in residence at the National Law Center. Credits allowed by way of advanced standing are not included in computing the average required for graduation.

Graduation Requirements.—See pages 42–43 for a statement of the graduation requirements..

RESIDENCE

Candidates for the Juris Doctor degree must complete a residence period of three academic years. Attendance in the day division for the fall and spring semesters constitutes residence for an academic year; similar attendance in the evening division constitutes residence for three-fourths of an academic year. Consequently, a day student must attend 6 semesters to meet residence requirements; an evening student must attend 8. Students authorized to take schedules of less than 10 hours in the day division or less than 6 hours in the evening division receive residence credit on a proportional basis. Students who attend the summer sessions receive fractional residence credit.

HONORS

The degree of Juris Doctor "With Honors" is awarded students who obtain a minimum cumulative average of 75 but less than 85; the degree of Juris Doctor

* This requirement may be satisfied by service on the *Law Review*, by satisfactory completion of a seminar which requires a research paper, or by satisfactory completion of Law 344, *Legal Writing*

"With Highest Honors" is awarded students who obtain a minimum cumulative average of 85.

ORDER OF THE COIF

The Order of the Coif, a national legal honor society, aims "to foster a spirit of careful study and to mark in a fitting manner those who have attained a high grade of scholarship." The George Washington University Chapter was established in 1926. Members are elected each year from the highest-ranking 10 per cent of the graduating Juris Doctor candidates.

PUBLICATIONS

The *George Washington Law Review*, published five times a year, is edited and managed by the students of the National Law Center. The *Law Review* is known for its emphasis on federal and public law; however, it is also devoted to research in other important legal areas. The staff of the *Law Review* is selected on the basis of a writing competition and on the basis of grades. The editorial board is selected from those students who have successfully completed the first year of *Review* work. Students receive 4 semester hours of academic credit for the two-year program.

The *Journal of International Law and Economics*, managed and edited by law students, is a biannual publication of the Law Center. It presents articles and commentaries on public and private international financial development, comparative law, and international law. The staff of the *Journal* is selected through a writing competition, and students earn academic credit for their work.

LAW CENTER ORGANIZATIONS

BLACK LAW STUDENTS OF AMERICA (BALSA)

The Black Law Students of America is a national Black law students organization which has chapters at 80 law schools. BALSA sponsors law speakers and various programs.

ENVIRONMENTAL LAW SOCIETY (ELS)

As part of the National Law Center's extensive Environmental Law Program, the Environmental Law Society is a group of students keenly interested in the quality of the environment and its relationship to law. ELS offers a short course on environmental law and is active in research and writing in this area.

INTERNATIONAL LAW SOCIETY

The International Law Society is an organization of students interested in the practice of international law. The Society sponsors speakers and various programs.

LA RAZA

A national Chicano law students organization which has chapters at various law schools, La Raza sponsors law speakers and various programs.

LAW FRATERNITIES AND SORORITIES

The chapters of Beta Kappa Pi, Delta Theta Phi, Phi Alpha Delta, and Pi Delta Phi at the National Law Center sponsor speakers and various soci occasions.

LAW STUDENTS CIVIL RIGHTS RESEARCH COUNCIL (LSCRRC)

The Law Students Civil Rights Research Council is a national organization o law students concerned with the legal problems of civil rights. LSCRRC offer clinical law projects for which students may receive academic credit.

PATENT LAW CLUB

The Patent Law Club, an organization of students interested in patent and re lated law, conducts an extensive speakers program as well as various socia events.

STUDENT BAR ASSOCIATION

The Student Bar Association is the law student governing body, responsible for allocating funds among the various student organizations. It also conducts a speaker program for the law school. All members of the student body are mem bers of the Student Bar Association.

TAX LAW ASSOCIATION

As an organization of students interested in careers in tax law, the Tax Law Association conducts various programs of interest to tax law specialists.



WOMEN'S RIGHTS COMMITTEE (WRC)

The Women's Rights Committee is an organization of all the women in the law school. It is primarily interested in the place of women in law schools and in the legal profession. WRC conducts seminars and sponsors speakers.

JOINT JURIS DOCTOR—MASTER'S DEGREE PROGRAM

In certain instances, arrangements may be made for students to work concurrently toward both the Juris Doctor degree in the National Law Center and a Master's degree in some fields in the University's Graduate School of Arts and Sciences, School of Government and Business Administration, or School of Public and International Affairs. Fields in which this program is available include Business Administration, Economics, International Affairs, Political Science, Public Administration, and Public Affairs. Students must be admitted both to the National Law Center and, separately, to the School which will confer the Master's degree, and must meet all requirements in each degree program. It is possible for a student to complete work for both degree programs within four years.

Master's and Doctoral Programs

THE ADMINISTRATION OF JUSTICE under law is a matter so vast and complex that some who hold the Bachelor of Laws or Juris Doctor degree feel the need for further study. The Master's and doctoral programs give students the opportunity to broaden and deepen their understanding of the law.

The Master of Laws candidate may follow a program of general study or concentrate in one of the specialized areas listed below. Courses in each of these areas are included in the 401–600 series. Graduates who complete their work in one of these areas may have the field of specialization noted on their diplomas.

Administrative Law: Economic Regulation
Comparative Law
Corporation Law
Environmental Law
Government Procurement Law
International Law
Labor Law
Law and Poverty
Law, Psychiatry, and Criminology
Law, Science, and Technology
Natural Resources Law
Patent and Trade Regulation Law
Taxation
Urban Legal Studies

Programs leading to the degree of Doctor of Juridical Science offer the advanced student the opportunity to concentrate on research and writing in a specific area of interest to the legal profession.

MASTER OF LAWS

ENTRANCE REQUIREMENTS

A Bachelor's degree from an accredited college or university* and a Bac of Laws, Juris Doctor, or equivalent degree from a law school which is a ber of the Association of American Law Schools or is approved by the A ican Bar Association are required. The applicant must demonstrate (by average or equivalent performance measure, high class standing, Law R experience, positions held, or professional achievements) that he is capab Master's level work. Advanced standing is not granted for credits earned a candidate for the first degree in law.

DEGREE REQUIREMENTS

The student must complete a residence period of not less than two semes which should be continuous. All requirements for the degree must be compl in this Law Center and in a period not exceeding three years from the tim registration for the degree. The student must complete 24 semester hour courses and writing projects with grades of 65 or above. A minimum aver of 75 is required. The student is expected to include Law 599–600 *Thes*



* The Dean is authorized to make exceptions in appropriate cases.

the 24–semester–hour requirement for the degree (for exception, see "Master's Thesis," below).

Candidates for the degree in a selected field of specialization must complete a minimum of 12 of the required 24 semester hours in courses and writing projects related to the selected field. Each Master of Laws program of study should include a substantial number of 401–600 series courses.

MASTER'S THESIS

Each candidate for the degree of Master of Laws is expected to write a Master's thesis (Law 599–600) under the supervision of a member of the faculty of the National Law Center. Four hours of credit will be granted for successful completion of the thesis. The purpose of this requirement is to demonstrate the ability of the student to perform research in a special area of the law and to produce a scholarly paper containing the results of this research. The thesis is expected to be of substantially the same quality as a Law Review article. The Dean may approve the substitution of 4 semester hours of approved course work for the Master's thesis if the student has demonstrated his research and writing ability in other courses taken in the degree program.

The thesis in its final form must be presented to the Dean no later than the date specified in the Calendar. Two complete copies are required. It is the responsibility of the candidate to obtain from the Office of the Dean a printed copy of the regulations governing the styling and reproduction of theses. The mandatory thesis binding fee of $10 must be paid at the time of registration for the last semester's work.

Accepted theses become the property of the University and are deposited in the Law Library, where the duplicate copies are bound and made available for circulation.

HONORS

The degree of Master of Laws "With Highest Honors" is awarded students who obtain a minimum cumulative average of 85.

RADUATE COURSES IN OTHER DEPARTMENTS

he Master of Laws candidate is encouraged to take graduate courses related to s field of interest in other departments of this University. A maximum of 6 nester hours will be credited toward the degree for such courses; however, edit will be granted only if the courses are given on campus. Courses numred 101–200 may be taken for graduate credit only if the student receives approval of the instructor at the time of registration and does additional rk, as prescribed by the department offering the course.

NSORTIUM OF UNIVERSITIES OF THE WASHINGTON TROPOLITAN AREA, INC.

andidate for the Master of Laws degree may take graduate courses at rgetown University Law Center through the Consortium of Universities of Washington Metropolitan Area, Inc. A maximum of 6 semester hours of courses will be credited toward the degree. Permission to take Conm courses must be granted by the Dean and the Registrar.

DOCTOR OF JURIDICAL SCIENCE

ENTRANCE REQUIREMENTS

Admission to candidacy for the degree of Doctor of Juridical Science requ
a Bachelor of Arts or equivalent degree from an approved college or uni
sity*; a Bachelor of Laws, Juris Doctor, or equivalent degree, earned with
rank, from a law school which is a member of the Association of Amer
Law Schools or is approved by the American Bar Association; outstan
capacity for scholarly work in the field of law; and faculty approval of
applicant's dissertation topic. The applicant must also demonstrate his wr
ability by submitting a copy of one or more papers or articles which he
written. He must submit an outline of his proposed dissertation topic in
detail, indicating by chapter and division within chapter the exact scope o
project. There should be a bibliography for each chapter listing books, rep
cases, and Law Review articles to be considered. Although the outline ca
predict every detail of the subsequent research, it must be sufficiently de
to afford the faculty a basis for evaluation.

DEGREE REQUIREMENTS

The candidate must complete (1) a residence period of not less than one
demic year; (2) a course of study and research—designated by his consult
committee and approved by the faculty—of no less than 8 semester h
including *Jurisprudence*, unless previously taken, and two seminars in w
research papers are required; and (3) an acceptable dissertation. The diss
tion must be submitted no later than three years from the date of approv
the dissertation subject. The applicant who proposes to write on a compar
law topic must have a reading knowledge of the language in which the rele
materials are to be found. At the conclusion of his first year of residence
at such other time as the faculty may set, the candidate must pass an oral e
ination in those fields of study selected by the consultative committee.
examination is conducted by the consultative committee and such other m
bers of the faculty and qualified experts as are selected by the faculty.

No later than the date specified in the Calendar, the candidate must su
to the Dean two complete copies of the dissertation and two copies of an
stract (not to exceed 600 words) of his dissertation. One copy of the abs
is sent to University Microfilms, Inc., for inclusion in their monthly pub
tion, *Dissertation Abstracts*, which is distributed nationally.

Printed copies of detailed regulations regarding the form and reproductio
the dissertation, preparation of the abstract, and services offered by Univ
Microfilms, Inc., are available in the Office of the Dean. The successful
didate for the doctorate is required, before receiving his degree, to pay
for the service rendered by University Microfilms, Inc. To be acceptable
dissertation must, in the opinion of the examining committee, constitute a
stantial contribution to the field of law concerned and be suitable for pub
tion. Additional information will be supplied by the Dean. Accepted diss
tions become the property of the University and are deposited in the
Library, where the duplicate copies are bound and made available for cir
tion.

* The Dean is authorized to make exceptions in appropriate cases.

Degree Programs for Foreign Students

THE NATIONAL LAW CENTER has several programs of study available to students trained in law outside the United States. These programs fall into two general categories: (1) those directed toward preparing the student for a bar examination in an American jurisdiction and (2) those that enable the student to return to his country with a more thorough understanding of some aspect of American law.

A student with a degree from a foreign law school is normally admitted to the Center as a Provisional Student, so that the faculty can evaluate his work before admitting him to degree candidacy. Appropriate credit will be granted for work taken as a Provisional Student.

In order to qualify for admission to the bar of an American jurisdiction, the student may apply for either the Juris Doctor (J.D.) or the Master of Comparative Law (American Practice) (M.Comp.L. (Am.Prac.)) degrees. The J.D. degree requires 84 semester hours of work in law school (credit is given for work in a foreign law school only in exceptional circumstances) and will qualify the student to take most U.S. bar examinations. The M.Comp.L. (Am.Prac.) degree requires 28 semester hours of work and satisfies the requirements of the District of Columbia Bar. *The student is cautioned to ascertain the requirements of the bar for which he intends to qualify prior to selection of his law school program.*

A student planning to return to his country may undertake a program leading to the degree of Master of Comparative Law (M.Comp.L.); or, if he has outstanding qualifications, he may undertake advanced work leading to the Master of Laws (LL.M.) or Doctor of Juridical Science (S.J.D.) degree. The M.Comp.L. degree programs enable the student to gain a broader comprehension of the American legal system by taking basic courses in the Law Center. The LL.M. and S.J.D. programs allow the student to work in advanced or specialized legal fields.

ADMISSION PROCEDURE

For general Admission information concerning all National Law Center students see pages 28–30.

Application must be received from *foreign applicants* no later than June 1 for the fall semester (April 1 for candidates for the Juris Doctor degree) and November 1 for the spring semester.

REQUIRED RECORDS

Applicants must request all educational institutions attended to send directly to the Dean official credentials listing subjects studied, grades received, examinations taken, and degrees received. Certified copies of diplomas and certificates from secondary schools and all colleges and universities attended are required. Records of state examinations and certificates are also needed. All records become the property of the University and *cannot* be returned.

LANGUAGE TEST

Students whose native tongue is not English are required to take the *Test of English as a Foreign Language* and attain a score of 550 for admission to the

National Law Center. Students are responsible for making arrangements taking the test and should address inquiries to TOEFL, Educational Tes Service, Princeton, New Jersey 08540, U.S.A. The completed application f should be returned to the Testing Service at Princeton well in advance of beginning of the semester for which the applicant seeks admission. The fee, which should be remitted with the application, entitles the student to his test score sent to three different institutions. Registration for the *Test of lish as a Foreign Language* does *not* constitute application for admissio George Washington University.

The Bulletin of Information, obtainable without charge, contains a desc tion of the test as well as rules regarding application, fees, reports, and conduct of the test; lists of examination centers; examination dates; and application blank. On the application for the test, the student should spe that the scores be sent to the Dean's Office.

ENTRANCE REQUIREMENTS

For the Degree of Juris Doctor.—Entrance requirements for foreign stud are the same as those stated on pages 11–12, except that advanced standin rarely granted for study in foreign law schools.

For the Degrees of Master of Comparative Law and *Master of Compara Law (American Practice).*—The entrance requirements are the successful c pletion of and graduation from a course in arts, philosophy, letters, or scien equivalent to graduation from a gymnasium, lycee, or liceo; and graduation law from a recognized foreign university.

For the Degree of Master of Laws.—The entrance requirements are the cessful completion of and graduation from a course in arts, philosophy, lett or sciences, equivalent to graduation from a gymnasium, lycee, or liceo; graduation in law from a recognized foreign university. The applicant m demonstrate (by good academic record or equivalent performance measu high class standing, positions held, or professional achievements) that he capable of Master's level work and must demonstrate a sufficient backgro in the Common Law to undertake the Master's program.

For the Degree of Doctor of Juridical Science.—The entrance requireme are the successful completion of and graduation from a course in arts, losophy, letters, or sciences, equivalent to graduation from a gymnasium, ly or liceo; graduation in law from a recognized foreign university; outstan capacity for scholarly work in the field of law; and faculty approval of applicant's dissertation topic. The applicant must also demonstrate his wri ability by submitting a copy of one or more papers or articles which he written. He must submit an outline of his proposed dissertation topic in s detail, indicating by chapter and division within chapter the exact scope of project. There should be a bibliography for each chapter listing books, rep cases, and articles to be considered. Although the outline cannot predict e detail of the subsequent research, it must be sufficiently definite to afford faculty a basis for evaluation.

DEGREE REQUIREMENTS

Juris Doctor, Master of Laws, and *Doctor of Juridical Science.*—Deg requirements for foreign students are the same as those stated on pages 20–21, and 22.

Master of Comparative Law.—The student must complete a residence period of not less than two semesters, which should be continuous. All requirements for the degree must be completed in a period not exceeding three years from the time of registration for the degree. The student must complete satisfactorily 24 semester hours of approved courses of the Center, or of such other departments of the University as the faculty of the Center shall approve.

Master of Comparative Law (American Practice).—The requirements for this degree are the same as those for the degree of Master of Comparative Law except that the degree of Master of Comparative Law (American Practice) requires 28 semester hours of course work with a cumulative average of at least 65.

Unclassified Students

TWO TYPES OF STUDENTS may be admitted to the National Law Center as Unclassified Students, in accordance with the following regulations:

1. A candidate for a Bachelor of Laws or Juris Doctor degree with an above-average record at another law school which is a member of the Association of American Law Schools or is approved by the American Bar Association, may at the discretion of the Dean, be admitted as an Unclassified Student to earn credits for transfer to the other law schools.

2. Graduates of law schools which are members of the Association of American Law Schools or are approved by the American Bar Association who wish to take advanced courses without pursuing degree programs may be admitted as Unclassified Students. Applicants with inferior records will not be admitted.

Unclassified Students participate in the work of the course, take examinations, and have their grades recorded. Credit earned as an Unclassified Student may be credited toward Master's and Doctor of Juridical Science degrees at this institution if the student transfers to degree status.

Continuing Legal Education

MEMBERS OF THE BAR wishing to keep abreast of current developments in the law may register for any of the courses in the National Law Center on a non-credit basis as Continuing Legal Education students. Such students do not take examinations in courses and no grades are recorded for their work.

A simplified admission and registration procedure is used and must be completed on or before the last day of regular registration for the appropriate semester. Continuing Legal Education students pay only the tuition fee on the semester-hour basis. They may not participate in student activities or benefit from the medical privileges of the University. (Continuing Legal Education registrations are subject to cancellation if courses are filled by regularly registered students.)

GENERAL INFORMATION

THE NATIONAL LAW CENTER has an enrollment of eighteen hundred students for the J.D. and Post-J.D. degree programs. Approximately one thousand students are enrolled in the full-time day division for the J.D. degree and three hundred and fifty are enrolled in the part-time evening division. Over four hundred students, many from abroad, are enrolled in the Post-J.D. degree programs.

DAY AND EVENING CLASSES

Day classes meet in the mornings in fifty-minute periods and in the afternoons in fifty-minute periods and also in sessions of two fifty-minute periods, Monday through Friday. Trial Practice Court and certain other courses meet for two-hour periods on Saturday mornings.

Evening classes meet from 5:50 to 7:40 p.m., Monday through Friday. A four-credit course, e.g., Evidence, meets two evenings a week; a three-credit course, e.g., Administrative Law, meets two evenings a week for one-half the semester and one evening for the other half; a two-credit course, e.g., Contracts II, meets one evening a week. The evening division conforms to the standards of the day division, the full-time faculty participating in the instruction.

Examinations for both day and evening classes may be given in the afternoon only. Examinations for day students may be given in the evening only.

UMMER TERM

term of two sessions, with day and evening classes, is offered in the summer. ontinuing students and transfer students may register for either or both sessions. *No beginning students are admitted to the Juris Doctor program in the mmer term.*

The summer term is shorter than a semester of the academic year, and, as a nsequence, a student must attend two and one-half summer terms to receive idence credit for one academic year or attend one and one-half summer ms to receive residence credit for a semester.

A maximum of 6 semester hours may be taken each session by day students. y students receive four-tenths of a semester of residence credit for each session of the summer term in which they are registered for 3 or more semester rs. A maximum of 4 semester hours may be taken each session by evening dents. Evening students receive three-tenths of a semester of residence credit each session of the summer term in which they are registered for 2 or more ester hours.

Summer students planning to take the New York bar examination mus
ister at the beginning of the term for both sessions and must complete bot
carry a program of at least ten classroom periods a week for day student
at least eight classroom periods a week for evening students.

Admission

APPLICANTS ARE URGED to submit application forms and complete crede
well in advance of the semester for which they seek admission. Two r
signed photographs and an application fee of $25 for a degree candidat
for an Unclassified Student, must accompany the application.

Forms for application for admission or readmission are available at
should be returned to the Office of the Dean of the National Law Ce
George Washington University, Washington, D.C. 20006.

For further details concerning students from foreign institutions, see p
23–25.

APPLICATION FOR ADMISSION

Juris Doctor Program.—Beginning students are admitted only at the start
the fall semester.

The applicant should register with the Law School Data Assembly Servi
(LSDAS) by completing and mailing the registration form supplied with ea
application blank. A transcript from each college or university attended sho
then be sent directly to LSDAS, Educational Testing Service, Box 944, Prin
ton, New Jersey 08540. No transcript should be sent to the National La
Center. The LSDAS will analyze the transcript and send a copy to this
school and others designated on the registration form. If the transcript whi
has been forwarded to LSDAS does not show evidence of receipt of a Bach
lor's degree, the applicant will be asked, upon acceptance, to submit a fin
transcript directly to the National Law Center.

To provide time for the evaluation of credentials of beginning students, a
papers, including the Law School Admission Test score, should be received
the National Law Center before March 1. This means that the October or D
cember Law School Admission Test should be taken (see "Entrance Requi
ments," pages 11–12).

All papers of transfer students should be received by the Office of the D
no later than May 1 for the fall semester, December 1 for the spring semes
and one month prior to registration for the summer session for which appli
tion is made.

For additional information, see the official *Pre-Law Handbook*, 1972
edition, available in October, 1972, and prepared by the Law School Admiss
Council and the Association of American Law Schools. This book includ
material on the law and lawyers, pre-law preparation, applying to law schools
and the study of law, together with individualized information on most Amer
can law schools. It may be obtained at college bookstores or ordered fro
Educational Testing Service, Princeton, New Jersey 08540.

Master's and Doctoral Programs.—Students are admitted at the beginning of
the fall semester, the spring semester, or any of the summer sessions.

Application for admission, together with all required credentials, must be received by August 1 for the fall semester, December 15 for the spring semester, and one month prior to registration for the summer session for which application is made.

Unclassified Students.—Lawyers who wish to take graduate courses are admitted at the beginning of the fall semester, the spring semester, or any of the summer sessions. Students who wish to earn credits for transfer toward a Bachelor of Laws or Juris Doctor degree at another institution are admitted to the summer sessions; they are admitted to the fall or spring semester only in unusual circumstances.

1. Application for admission, with required credentials, for a student who wishes to earn credits for transfer toward a Bachelor of Laws or Juris Doctor degree at another law school (see page 25), should be received at the Office of



the Dean at least one month prior to the first day of registration for the se
ter or summer session for which application is made.

2. Application for admission, with required credentials, for lawyers who
to take graduate courses (see page 25), should be received at the Office o
Dean by August 1 for the fall semester, December 15 for the spring seme
and one month prior to registration for the summer session for which app
tion is made.

READMISSION

A student who was previously registered but did not attend during the
recent semester (summer term excluded) should file an application for r
mission. Closing dates for readmission are the same as those for admis
(see pages 28, 29).

If the student has attended one or more higher institutions during his
sence from the University or if he applies as a degree candidate and was
viously a nondegree student, he must have complete, official transcripts sen
the Dean.

Registration

BEFORE ATTENDING CLASSES each student must present himself in person
registration. No student will be registered until proper credentials have be
filed and approved (see "Admission").

No registration is accepted for less than a semester or one summer session.

A student may not register concurrently in George Washington Universi
and another institution. Registration in more than one college, school, or d
sion of the University requires the written permission of the deans concerne
prior to registration.

ELIGIBILITY FOR REGISTRATION

A student who is suspended or whose record is not clear for any reason is n
eligible to register.

New Student.—Upon receipt of a *letter* of admission a new student is el
gible for registration on the stated days of registration.

Readmitted Student.—A student previously registered who was not register
for courses during the preceding semester or summer session must apply fo
and receive a letter of readmission (see "Readmission," above) before he
eligible for registration.

TIME AND PLACE OF REGISTRATION

Registration is held in Stockton Hall, 720 Twentieth Street, N.W., during
following periods: *fall semester,* September 5 and 6, *spring semester,* Januar
17 and 18.

A late-registration fee of $15 is charged each student who is permitted
register after the regular registration days.

Registration may be changed only with the permission of the Dean.

Fees and Financial Regulations

THE FOLLOWING FEES AND FINANCIAL REGULATIONS were adopted for the academic year 1972–73. (See page 32 for projected tuition increases for 1973–76.)

Tuition Fees

All law students except candidates for the degree of Doctor of Juridical Science:

Full-time program (11 to 15 hours*), each semester	$1,100.00
Part-time program or hours in excess of 15 for all candidates for the degree of Juris Doctor, for each semester hour	80.00
Part-time program for students other than candidates for the degree of Juris Doctor, for each semester hour	82.00
Doctor of Juridical Science,† including the final examination	2,300.00

University Center Fee (nonrefundable)

For students registered for 11 or more semester hours: Each semester	37.50
For students registered for less than 11 semester hours in a semester: For each semester hour for which the student registers	3.50
For students maintaining "continuous registration" status: Each semester	3.50

Graduation Fees

Juris Doctor, Master's, Doctor's degrees	25.00
Fee for binding Master's Thesis	10.00
Fee for Microfilm Service (S.J.D. candidates)	30.00

Residence Hall Fees (See page 45)

Special Fees

Application fee (degree candidate), nonrefundable	25.00
Application fee (unclassified student), nonrefundable	5.00
Application fee for room reservation, nonrefundable	100.00
Tuition deposit fee charged each student admitted to J.D. degree candidacy	100.00
Fee for special examinations, for each subject	5.00
Late-registration fee, for failure to register within the designated period	15.00
Continuous Registration fee, for post-J.D. students, to maintain "continuous registration" during any semester of absence from the University or after completion of tuition requirements.‡ Due and payable on the official days of registration	82.00
Late-payment fee, charged for failure to make payments when due (see "Payment of Fees," pages 32–33)	15.00
Financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," pages 32–33)	35.00
Returned check fee, charged a student whose check is returned because of insufficient funds or improper drafting	15.00
Transcript fee, for each transcript of record	2.00

*With the prior permission of the Dean, a J.D. degree candidate may take more than 14 semester hours after his first year of study. *Any student* taking in excess of 15 hours a semester must pay the hourly rate for each semester hour in excess of 15, in addition to the full-time program fee of $1,100.00.

†The tuition fee is to be paid at the rate of $575.00 a semester for four successive semesters, exclusive of the summer term or terms. No "continuous registration" fee will be charged if a third year is needed for completion of the degree requirements. If the Faculty should approve an extension of time, the student must maintain continuous registration and pay the continuous registration fee.

‡The continuous registration fee applies toward neither financial nor residence requirements for degree. This fee does not apply to students granted military leave (see page 43).

Registration on campus in the University entitles each student to the follo University privileges: the services of the Student Career Services Office; th of the University Library; gymnasium privileges; admission to all athletic tests, unless otherwise specified; subscription to the *University Hatchet*, student newspaper; admission to University debates; medical attention as scribed under Student Health Service. These privileges terminate and a dent is no longer in residence when he withdraws or is dismissed from University.

PROJECTED TUITION INCREASES 1973–76

In order that students and their parents may plan more realistically, tuitio creases for the academic years 1973–74, 1974–75, and 1975–76 have estimated as follows:

*Increase by year (full-time students):

1973–74	$15
1974–75	
1975–76	

Increase by semester hour (part-time students):

1973–74	
1974–75	
1975–76	

Every effort will be made to keep tuition increases within the above lim However, it is not possible to project future economic data with certainty. circumstances may require an adjustment in these estimates.

PAYMENT OF FEES

No student is permitted to complete registration or attend classes until charges are paid. Tuition and fees for each semester are due and payable full at the Office of the Cashier at the time of each registration. Checks postal money orders should be made out to George Washington University

The Student Accounts Office has responsibility for billing and maintain student accounts for tuition, various fees, and room and board charges student registered for 6 semester hours or more may sign a deferred paym contract with the Student Accounts Office at the time of each registration p mitting him to pay one-half of the total tuition and fees (except for fees able in advance) at the time of registration and the remaining half on or bef November 1, 1972 (for the fall semester), and March 14, 1973 (for the spr semester). Interest at the rate of 8 per cent per annum on the unpaid bala will be charged from the date of registration to the date payment is made University will not obligate itself to notify the student, in advance, of the ment-due date for the second half of the semester charges.

Students receiving tuition assistance in the form of scholarships, governm tuition contracts, or other forms of tuition awards are not permitted to sig deferred payment contracts unless the total tuition and fee charges exceed value of the tuition awards by $500 or more. Under such circumstances student may be permitted to pay one-half of the amount due from the stud

* These yearly increases are also projected for the total fee for work leading to the degree Doctor of Juridical Science.

at the time of registration and to defer the balance by signing a deferred payment contract.

Students who fail to make any payment when due will be automatically charged a $15 late-payment fee and will be subject to the interest charge of 8 per cent per annum. Accounts which become 30 days past due will be financially encumbered. In the event a student's account is financially encumbered, the student forfeits his right to the use of deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $35.

Students auditing courses are subject to all fees charged to students registered for credit.

In addition to the loan funds listed on page 36, there are various plans available, through the Girard Bank, Philadelphia, Pa.; Funds for Education, Inc., Manchester, N.H.; and the Riggs National Bank, Washington, D.C.; by which students may, if they meet various conditions, borrow money on a relatively short-term basis.

WITHDRAWALS AND REFUNDS

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean. Withdrawal from courses is permitted after the midpoint of a semester only in extraordinary circumstances. Notification to an instructor is not an acceptable notice.

Refunds are granted only during the fall and spring semesters. No refunds are granted during the summer sessions. In authorized withdrawals and changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule:

1. *Complete withdrawal* from the University:

FALL SEMESTER

Withdrawal dated on or before September 15, 1972.....90 per cent
Withdrawal dated September 18 to September 29, 1972....75 per cent
Withdrawal dated October 2 to October 13, 1972.....50 per cent
Withdrawal dated after October 13, 1972.....none

SPRING SEMESTER

Withdrawal dated on or before January 26, 1973.....90 per cent
Withdrawal dated January 29 to February 9, 1973.....75 per cent
Withdrawal dated February 12 to February 23, 1973.....50 per cent
Withdrawal dated after February 23, 1973.....none

2. For a *change in status from full-time to part-time student* or for *partial withdrawal by a part-time student*, the above schedule applies to the difference in charges between the original program and the adjusted program continuing in effect.
3. A student enrolled in a full-time program who drops or adds a course and

continues to be in a full-time program will have no financial adjus
of tuition made other than those involving course fees.

4. A student who is granted military leave before completing the semest
receive credits for current charges in accordance with the schedu
complete withdrawal from the University (see No. 1, page 33). Pay
made in excess of the nonrefundable balance will be refunded to th
dent. The nonrefundable balance will be maintained as a deferred
for use by the student when he returns to the University (see "M
Leave," page 43).
5. Regulations governing student withdrawals as they relate to residenc
and food service charges are contained in the specific lease arrangeme

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In no case will tuition be refunded or reduced because of absence from cl

Payment applies only to the semester for which a registration charge
curred and will not be credited to another semester (exception: stu
granted military leave, see page 43).

Authorization to withdraw and certification for work done will not be
a student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can
banking arrangements in the community.



Financial Aid

THE NATIONAL LAW CENTER has been able in recent years to assist many students in obtaining the financial aid they require, through full or partial scholarships, various loan programs, part-time employment, or a combination of these kinds of assistance.

GRADUATE AND PROFESSIONAL SCHOOL FINANCIAL AID SERVICE

The National Law Center participates in the Graduate and Professional School Financial Aid Service (GAPSFAS), which provides an analysis of an applicant's financial needs. Entering students wishing to receive financial aid should request the materials from GAPSFAS, Education Testing Service, Box 944, Princeton, New Jersey 08540. The information provided by the applicant and his parents will be analyzed, and a copy of the report will be sent to the Law Center. Students entering the National Law Center who desire to be considered for a scholarship must submit a letter to the Law Center by March 1 outlining their academic qualifications, their extracurricular activities, and their reasons for believing a scholarship award to them is justified.

Students needing financial assistance should file with GAPSFAS in time for their reports to be received at the Law Center as early as possible since the Committee on Student Financial Aid of the Center will begin making awards in March, and available funds are limited.

No awards will be made to an entering student until his admission has been finalized.

JURIS DOCTOR PROGRAM

SCHOLARSHIPS AND RESEARCH ASSISTANTSHIPS

Application and correspondence concerning scholarships and research assistantships should be sent directly to the Dean. Unless otherwise specified, application and supporting credentials should be submitted no later than March 1 preceding the period for which the award is made.

Mildred Gott Bryan Scholarship Fund (1965).—Partial scholarship aid for students in the National Law Center.

Charles Worthington Dorsey Memorial Scholarship (1947).—Memorial to Charles Worthington Dorsey, LL.B. 1881, LL.M. 1882. A full-tuition scholarship for the course leading to the degree of Juris Doctor, awarded to a needy and promising graduate of this University with a Bachelor of Arts or equivalent degree. Ordinarily this scholarship is awarded once every three years.

Honor Scholarships.—Two scholarships available each year to students entering upon full-time study. Each scholarship provides a cash award for the first year, in addition to tuition aid, in an amount depending on need, for all three years. These scholarships are awarded on the basis of outstanding college records, both academic and extracurricular; Law School Admission Test scores; and need. To retain the scholarship for the second and third years, the candidates must maintain a *B* average, both for each year and cumulative.

Law Center Tuition Remission.—For students from minority groups, based on financial need.

Phi Delta Delta Scholarships (1959).—Zeta Chapter of Phi Delta Delta Legal Fraternity (International), provides tuition aid to a woman student in the second year of the Juris Doctor program who excelled in scholastic achievement and service to the Center in her first year.

Research Assistantships.—Available each year to students currently e
Each assistant receives an annual stipend. Awards are made on the b
academic standing, financial need, capacity for leadership, and resear
writing potential. Applications should be submitted no later than July 1

Research Scholarships.—Available each year to students currently e
preferably to applicants who are completing the second year. Scho
awards are made on the basis of academic standing, financial need, capac
leadership, and research and writing potential. Applications should be sub
no later than June 1.

Trustee Scholarships.—Scholarships awarded each year to entering st
for tuition aid, in an amount depending on need, in the morning division
didates must have demonstrated qualities of leadership in addition to sch
attainment. To retain the scholarship, the successful candidate must ma
a *B* average, both for each year and cumulative. Application must be
to the Dean before March 1.

Tuition-aid scholarships are also available to continuing second- and
year full-time students with demonstrated scholastic ability, on the ba
financial need and capacity for leadership. Application should be made
Dean prior to June 1.

Frank S. Whitcomb Scholarship Fund (1971).—Bequest of Frank S.
comb "for the purpose of aiding and assisting worthy young men in sec
a legal education."

LOAN FUNDS

Through the generosity of friends of the University a number of loan f
are available. Among them are the Robert Ash Loan Fund; the George
Beneman Loan Fund; the Robert M. and Mary McConnel Cooper Loan F
the District of Columbia Bar Association Loan Fund; the J.W. Ehrlich Fou
tion Loan Fund; the Harold L. and Violet George Foundation Loan Fund
George Washington Law Association Loan Fund; the Jephson Educat
Trust Loan Fund; the Law Association Loan Fund for the law classes of
1918, 1921, 1924, 1929, 1931, 1933, 1935, 1936, 1937, 1938, 1939,
1942, 1945, 1950, 1951, 1952, 1953, 1955, 1959, 1960, 1961, 1962,
1964, 1965; the Oscar Lawler Memorial Loan Fund; the Horace L. Lo
Memorial Assistance Fund; the Jessie B. Martin Loan Fund; the Mike Pele
Loan Fund; and the Orville Hassler Walburn Memorial Loan Fund.

In addition, financial assistance is available through the Guaranteed Stud
Loan Program, National Defense Education Act loans, the American Bar
sociation Loan Program, and other sources.

Application for financial assistance should be made in the Office of the D

MASTER'S AND DOCTORAL PROGRAMS

FELLOWSHIPS AND RESEARCH OPPORTUNITIES

Application should be made before March 15 preceding the period for
the award is made. The applicant should submit an application for admi
as a degree candidate and a personal letter applying for a fellowship to
Dean. The letter of application should contain complete biographical
information as to experience in practice or teaching and his draft or milit

status, copies of or citations to his published legal writings, and such other information as he believes will be of assistance in the consideration of his application. He should arrange for letters of recommendation to be sent from two members of his law faculty directly to the Dean. His academic rank in class should be included either in the transcript of his law school record or in the letters of recommendation.

Environmental Law Fellowship.—A fellowship of $6,000 plus tuition for the academic year, for a program leading to the degree of Master of Laws with specialization in Environmental Law. The recipient of this fellowship will follow an approved program of research and study under the supervision of the Director of the Environmental Law Program.

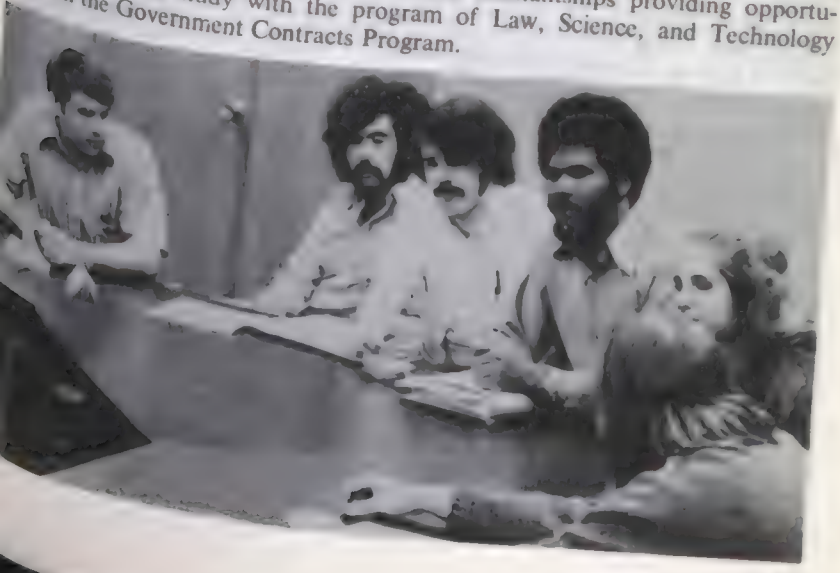
Government Procurement Law Fellowship.—A fellowship of $6,000 plus tuition for the academic year, for a program leading to the degree of Master of Laws with specialization in Government Procurement Law. The fellow takes 12 semester hours of approved courses over two semesters. The balance of his time is spent in research, writing, and editorial work under the guidance of the staff of the University's Government Contracts Program. The candidate is chosen on the basis of ability to do superior legal work, demonstrated by law school record or work experience, and genuine interest in government procurement law.

Law Center Tuition Remission.—For students from minority groups, based on financial need.

Richard Paul Momsen Fellowship for Brazilian Graduate Law Students.—Bequest of Richard Paul Momsen, LL.B. 1912. Awarded 1972–73 and alternate years, for the study of U.S. constitutional law.

Teaching Fellowships.—Two fellowships available each year with a stipend of $6,000 plus tuition for an approved course of study leading to an advanced degree. Teaching fellowships are awarded for a term of two academic years. Fellows conduct the first-year course in Legal Research and Writing and work with the students to improve their legal writing ability. By arrangement with the Dean, they are also given the opportunity to teach additional courses.

Research Study Opportunities.—Research assistantships providing opportunity for graduate study with the program of Law, Science, and Technology and with the Government Contracts Program.



Prizes

Charles Glover Prize.—Established by Charles Carroll Glover, Jr., an H
orary Trustee of the University, in memory of his great-grandfather, an illu
ous member of the bar of the District of Columbia. Consists of selected
books. Awarded annually to the student who has attained the highest ave
grade in the third-year, full-time course.

Kappa Beta Pi Prize.—Twenty-five dollars awarded annually by Eta Al
nae Chapter to the woman law student who attains the highest average for
first year.

John Bell Larner Prize.—By bequest, a medal awarded annually to
member of the graduating class who attains the highest average grade in
entire course for the degree of Juris Doctor.

John Ordronaux Prizes.—By bequest, $75 awarded annually to the stud
who has attained the highest average grade in the first-year full-time cour
and $75 to the student who has attained the highest cumulative average gr
at the end of the second-year, full-time course.

Jennie Hassler Walburn Prize.—A cash reward to the outstanding studen
the field of civil procedure, established by the will of the late Professor Or
Hassler Walburn in memory of his mother.

Regulations

ACADEMIC WORK LOAD

Juris Doctor Candidates.—Juris Doctor candidates without substantial o
side employment may take a program of studies of 14 hours a week. Such s
dents may take courses in the evening only if they are not scheduled in the da
time and if a majority of the hours taken are in day courses. The Dean
authorized to approve programs of study of more than 14 hours in exceptiona
cases; however, no program will be approved which would permit the stude
to complete requirements for the degree in less than 28 months after he beg
his first year of law study. Students with 20 hours or more of outside emplo
ment, whether in the day or evening division, must take a limited program
studies not exceeding 10 hours a week. Students taking a majority of th
classes in the evening may not take more than 10 hours a week; the minimu
load is 8 hours, except in special cases where 6 may be approved by the D
for a limited time. A minimum schedule of 11 hours in the day division
required except in exceptional circumstances when a reduced program is
thorized by the Dean.

Students taking more than 8 hours in the day division or 4 hours in
evening division must have the permission of the Dean to take a Bar Revie
course.

Students may transfer from the day division to the evening division
with the permission of the Dean.

With the approval of the Dean, second- and third-year students may take
maximum of 6 semester hours of appropriate courses in other departments
the University; such a student must receive a grade of at least *B* to obtain cre
for such courses, and in no event will the grade count in computing his cum
lative average.

Master's Candidates.—Master's candidates without substantial outside employment may take a maximum of 12 hours a week. Students with 20 hours or more of outside employment must take a limited program of study not to exceed 8 hours a week. The minimum load is 4 hours unless approval for fewer hours is given by the Dean for a limited time.

ATTENDANCE

Regular attendance at classes is required and is necessary for successful work. A student who is deficient in class attendance in any course may be barred from taking the examination.

CHANGES IN PROGRAM OF STUDIES

A student may not add courses or change from one section to another of the same course without the approval of the Dean. Students may drop courses only with the written approval of the Dean. Under no circumstances may any



student drop a course after the last day before regularly scheduled examina
tions begin in any semester or summer session.

RESEARCH PAPER IN LIEU OF EXAMINATION

The preparation of a research paper is required in lieu of an examination in seminars and in other courses, as indicated in the course descriptions. The research paper must be submitted by the first day of the examination period (the first day any examination is given in any course). For sufficient reason the instructor may extend the time beyond this date to a later date, subject to the following conditions: (1) no student will receive any credit for the course for any purpose until a paper acceptable to the instructor has been submitted. (2) if a paper is submitted after the last day of examinations, the only grade the student may receive for the course is *CR* (credit) or *NC* (no credit), except that failure ultimately to submit any paper for the course will result in a grade of 45. Students who are candidates for the J.D. degree may register for one such course in each semester of their third year, with the approval of the Dean such students may register for more than one such course each semester. Approval of the Dean is required for second-year students to take such courses.

EXAMINATIONS

Written examinations are held at the end of most courses. Every student is required to take the regular examinations unless excused. No excuse for absence will be granted except by the Dean and then only for illness or other emergency. Application for excuse must be made in writing not later than one month after the date of the examination. A student excused from a final examination will be permitted to apply to the instructor for a credit/no credit determination. The instructor will select the mode of determination (for example, a make-up examination or paper). The student will have the option of (1) complying with the instructor's procedure of determining credit/no credit, or (2) having the grade *I* (incomplete) entered on his record and taking the next regularly scheduled examination for a numerical grade. The examination may not be taken after exclusion for low scholarship.

Permission to take an examination before the regularly scheduled date will not be granted. Permission to take a postponed examination is limited to the situations provided for in the preceding paragraph.

A student who has been excused from taking a regular examination and who is a candidate for a degree to be conferred prior to the next regular examination in the subject may petition the scholarship committee, which may authorize such action as the circumstances require.

If a student fails to take an examination, a grade of 45 will be recorded unless he has been excused from the examination as provided above or has obtained the Dean's permission to drop the course.

CREDIT/NO CREDIT OPTION

Candidates for the degree of Juris Doctor may take, in addition to courses regularly given on a "credit/no credit" basis, 3 semester hours of elective course work on a "credit/no credit" basis, and will receive a grade of "credit" if the course is satisfactorily completed with a grade of 65 or better.

GRADES

Grades are given in numerical terms equivalent to letter grades as follows: 85–100, *A*, excellent; 75–84, *B*, good; 65–74, *C*, satisfactory; 55–64, *D*, poor—below standard for graduation; 45–54, *F*, failure. In courses 220, 321–22, 346, 365, 385, 399, 459, 509, and 593 grades are *CR*, credit; *NC*, no credit. A student who has been excused from failure to take a regularly scheduled examination is given the grade of *I*, incomplete, and a student who has been barred from taking an examination because of excessive absences is given the grade of *EA*. See "Examinations" (page 40) for grade upon failure to take an examination. Grades between 55 and 100 indicate that the work has been completed and credit given. Grades between 55 and 64, however, do not represent satisfactory work and adversely affect a student's cumulative average. No credit is given for grades below 55. A student may not repeat a course he has failed.

The cumulative average of a student includes all grades in all courses taken while he is a candidate for a particular degree. When a course is repeated (see "Academic Dishonesty," page 43), both the first grade and the subsequent grade or grades are counted in the cumulative average.

EXCLUSION AND PROBATION FOR POOR SCHOLARSHIP

Candidates for the Degree of Juris Doctor.—A student whose cumulative verage at the end of any semester falls below 65.0 but is above 64.0 will be otified that he is on probation. If such a student fails to raise his cumulative erage to 65.0 at the end of the next semester, he will not be permitted to gister for any succeeding semester unless he petitions for and receives the rmission of the Scholarship Committee.

A student whose cumulative average at the end of any semester falls below 0 will not be permitted to register for any succeeding semester unless he itions for and receives the permission of the Scholarship Committee to reg-r.

A student who fails more than one course over his entire period of law study not be permitted to register for any succeeding semester unless he petitions and receives the permission of the Scholarship Committee.

student who is not permitted to register under the foregoing provisions be excluded as of the beginning of the semester for which he was ineligible gister.

udents who are registered at the time they receive notice that they will not ermitted to register for the next semester are entitled to withdraw from ol and to receive a full refund of the tuition for the semester, or to com-the work for which they are registered.

y student excluded may petition for reinstatement; if he can demonstrate his low grades were due to circumstances beyond his control and that he e capacity to pursue the study of law with a definite likelihood of suc-he may be readmitted subject to such conditions as may be imposed by holarship Committee.

pite the above provisions, a student will be allowed to complete his first emesters of law study before he is denied permission to register for a ding semester.

term "semester" includes a session of the summer term.

Candidates for Masters' and Doctoral Degrees.—A candidate for a M or doctoral degree whose work is not satisfactory in the opinion of the f taking into consideration the requirements and standards for the degree, by action of the faculty, be excluded at the end of the semester for whi is currently registered.

Unclassified Students.—An unclassified student whose work is not sa tory may be excluded at the end of the semester for which he is currentl istered.

SUMMER SCHOOL CREDIT

Students planning to attend summer school sessions at other law school desiring to use credits obtained at such schools in their Juris Doctor pro at this Center must first have the courses they wish to take approved b Dean. In no event will credits be recognized in excess of those which be obtained in a similar period in this program.

TRANSCRIPTS OF RECORD

Official transcripts of student records will be issued on request of the stu or former student. A fee of two dollars is charged for each transcript. transcript will be issued for a person who does not have a clear fina record.

CONTINUOUS REGISTRATION

Degree candidates are expected to maintain continuous registration until degree requirements are satisfied. By failing to register for one semester more, the student breaks his registration and must be readmitted (see "Re mission," page 30). A "Readmitted Student" is required to satisfy the curr lum requirements existing at the time of his readmission. Post-J.D. stude who have completed course registration may maintain continuous registrat by paying the "continuous registration" fee (see page 31); *J.D. degree ca didates may not maintain continuous registration by paying the "continu registration" fee.*

GRADUATION REQUIREMENTS

Diplomas are awarded at a February Convocation, at a June Commencem and in September.

To be recommended by the Faculty for graduation, a student must have m the admission requirements of the National Law Center; completed satisfa torily the scholarship, curriculum, residence, and other requirements for degree for which he is registered; and be free from all indebtedness to University. Registration, either for course work or on the "continuous regist tion" fee basis, is required for the semester or summer session immediate preceding the awarding of the degree.

Application for Graduation.—An "Application for Graduation" form mu be filed and the appropriate fee paid at the time of registration for the s semester or summer session of the final year. Students completing degree re quirements during the Summer Sessions will be awarded diplomas (no form convocation) September 30, *provided* they have completed all degree requ

ments and have applied for graduation as a part of registration for the Summer Sessions.

ACADEMIC DISHONESTY

Academic dishonesty on the part of any student will result in a disciplinary grade of *F* for the course involved and also may, upon the recommendation of the Dean's Council, result in his suspension from the University for a stated period, at the end of which time he may petition for readmission. Upon approval of the Dean's Council, the disciplinary grade of "Failure—Academic Dishonesty" will be recorded for the course involved, and this grade will be employed in the computation of the cumulative average. A student so suspended shall be withdrawn from all other courses except those in which all work has been completed.

MILITARY LEAVE

A student called to active duty may be granted military leave for the period of active duty, upon presentation to his Dean of a copy of his orders and a petition for such leave. The maintenance of "continuous registration" is not required of the student on military leave; however, he must apply for readmission to the University well in advance of the semester in which he expects to return. Payments for tuition and fees which are not refunded to the student at the time he is granted military leave will be maintained as a deferred credit for his account and use upon return to the University.

UNIVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATION

In general, the policy of the University is one of attempting to keep the student's record confidential and out of the hands of those who would use it for other than legitimate reasons. At the same time, the policy must be flexible enough not to hinder the student, the University, or the community in their legitimate endeavors.

No information concerning a student will be released except as noted below:

1. Information such as whether or not the student is currently enrolled; dates of attendance; verification of date and place of birth; degrees earned, if any, date, major field or area of concentration, and honors received; home and local addresses and telephone numbers; school, college, or division of enrollment, and class; verification of signature; name and address of parent or guardian.

2. The issuance of formal transcripts of record to recognized institutions of higher learning; the certification of academic achievement to the various recognized professional associations (law, medicine, engineering, education, etc.).

Additional information will be released only on written authorization from the student, or by court order or subpoena. If a subpoena is served, the student whose record is being subpoenaed will be notified and the subpoena will be referred to the University's legal counsel.

Government investigative agencies have no inherent right to access to student files and records. If expressly requested, properly identified representatives from federal, state, or local government agencies may be given the information listed under No. 1 above.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

RIGHT TO DISMISS STUDENTS

If a student knowingly makes a false statement or conceals material information on an application for admission, registration card, or any other University document, his registration may be canceled and he will be ineligible (except by special action of the Faculty) for subsequent registration.

The right is reserved by the University to dismiss or exclude any student from the University or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

RIGHT TO MAKE CHANGES IN PROGRAMS

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

PROPERTY RESPONSIBILITY

The University is not responsible for the loss of personal property in any University building. A "Lost and Found" Office is maintained in the Campus Security Office.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 95–97) contains regulations recently approved by the University's Board of Trustees.

University Computer Center

THE UNIVERSITY COMPUTER CENTER is located on the first floor of Stuart Hall, 2013 G Street, N.W. The facilities of the Center are available for academic purposes to all registered students and to members of the instructional staff. The Center has as its principal mission the provision of a powerful computing system which serves the University in its educational and research endeavors. The Center's programming staff concentrates its efforts in conducting faculty and staff seminars, consulting with users in the preparation of complicated programs, and carrying out computer-oriented research.

The Computer Center equipment consists of an IBM system 360 Model 50 computer (to be replaced by an IBM system 370 model 145) with large capacity on-line disk storage, a card read/punch, a high-speed line printer, and four tape drives. The principal languages available to the user are FORTRAN IV, COBOL, Programming Language One (PL/1), Assembler Language, and ALGOL. In addition, numerous utility, statistical, data manipulation, and simulation systems and special languages are available in the library of pro-

grams. Facilities are available on a first-come, first-served basis for preparation of programs and data.

Computer programming courses are offered by the School of Government and Business Administration, the Department of Statistics, and the School of Engineering and Applied Science. In addition, many other departments offer courses that utilize the computer as a research adjunct to course work.

The Computer Center is normally open 24 hours a day.

Student Services

ESIDENCE HALLS

OMPLETE INFORMATION concerning the University's residence halls is available rom the Director of Housing, George Washington University, Washington, .C. 20006. Information concerning off-campus housing near the University ay be obtained at this Office. The reservation of rooms in private houses ust be made by students.

Admission to the University does not include a room reservation. Informaon concerning housing may be obtained by writing directly to the Director Housing, George Washington University, Washington, D.C. 20006.

72–73 RESIDENCE HALL RATES PER PERSON FOR TWO SEMESTERS*

adison Hall, double room, $775 per student; Graduate Hall, apartment for ee (apartments in this hall have kitchen facilities), $825 per student.

OD SERVICE*

od service is available from September 5 through December 22, 1972, and m January 8 through May 5, 1973, with vacation periods and holidays luded. The rate for the seven-day, 20 meals per week plan is $680 for the demic year; the rate for the five-day, 15 meals per week (Monday through day) plan is $640 for the academic year. The well-balanced meals are ed cafeteria-style.

NSON HALL APARTMENTS

ison Hall is a University-owned and operated apartment house containing ne-bedroom and 54 efficiency apartments. Graduate and married students given priority for residence until July 15 each year. All leases are for one onth year.

D HECK MARVIN CENTER

Cloyd Heck Marvin Center serves as the campus community center, pro- services, conveniences, and recreational and social opportunities for nts, faculty, staff, alumni, and guests. Its wide range of facilities pro- the setting for a variety of programs conducted by the University Pro- Board; the departments of Drama, Dance, and Music; and other student culty organizations.

*nce hall and food service prices subject to change.

A two-board structure, representative of all elements of the University c munity, plays an important role in the day-to-day functioning of the Cen The Governing Board and the Operations Board work closely with the f time staff in the development of procedures and policies which provide a fra work for the Center's operation.

STUDENT HEALTH SERVICE

The Student Health Service is an outpatient clinic designed to assist all s dents registered on campus with their health needs while attending the U versity. This service, located at 935 22nd Street, N.W. (in the H.B. Burns M morial Building), assists with health conditions and medical emergencies advice and treatment, proper referral when necessary, and cooperation w other physicians and medical facilities.

During the academic year, the hours are 9 a.m. to 10 p.m., Monday throug Friday, and 9 a.m. to 12 noon on Saturday. The weekday hours during th summer sessions are from 9 a.m. to 9 p.m.; Saturday hours are 9 a.m. to noon. A physician is in attendance during these hours.

For serious illnesses or emergencies that occur when the Student Healt Service is closed, students may call the Medical Bureau (223-2200), or go t the Emergency Room of the University Hospital for treatment. Charges fo both of these services are solely the responsibility of the student.

Charges for services that are not available through the Student Health Ser ice, such as X-ray and laboratory tests, specialty services, and consultations, etc., must be paid by the student.

The Student Health Service is available only to those students who are cur rently enrolled on campus in the University. A student who is not currently enrolled, or one who has severed his connection with the University, is ineligible for this service. This service is not available between the last day of examinations for a semester or summer session and the completion of regis tration for the next semester or summer session.

A student intending to train for an athletic team is required to pass a medical examination. The University is not responsible for injuries received in intercollegiate or intramural games, or in any of the activities of the Department of Physical Education, Health, and Recreation.

HEALTH AND ACCIDENT INSURANCE

In addition to the above services, the Student Health Service Staff has arranged for Health and Accident Insurance, on an elective basis, for *full-time* students. Arrangements for insurance coverage are the responsibility of the student. The University assists in the subscription process by administering application cards and collecting fees during official registration periods.

A student must subscribe and pay for the coverage *only* when he pays his tuition and other fees at registration. For those few students who register late, the subscription will be available during official late registration. *Subscription during late registration will not be available for those students who previously registered and failed to subscribe at that time.* Students who participate in the pre-registration, conducted in the spring for the following Fall Semester, must subscribe for the coverage at the time of pre-registration. The fee will be included with the tuition bill and must be paid by August 1.

The fee charged provides coverage on a 6-month basis—September through February for those subscribing for the fall, and March through August for those subscribing for the spring. The coverage is effective, with minor variations (see available folder), whether the student is at the University, at home, or elsewhere. The fee charged at each official registration period will be the payment required for full coverage for a 6-month period and must be paid in full at the time of subscription.

The policy contract is between the individual student and the insurance carrier and is accepted at any hospital or emergency room that accepts this type of medical coverage. Details of the policy are contained in a folder available at the Student Health Service Office.

STUDENT EMPLOYMENT

The Law Center helps in the placement of its students and maintains a placement service for that purpose. In addition, the Student and Alumni Career Services Office, Woodhull House, 2033 G Street, N.W., provides assistance to students seeking full-time, part-time, or temporary employment. This Office maintains a registry of positions available and refers qualified applicants for consideration. Information is also available on Civil Service examinations.

A student taking more than ten semester hours must limit outside employment to less than twenty hours (see "Academic Work Load," pages 38–39). It is urged that full-time students refrain from engaging in outside employment during their first year. Although work in some special areas may contribute to the learning and experience of the student, as a general rule it will compete with time needed for adequate study and preparation, which are at the heart of good legal education.

LACEMENT SERVICE

he Law Center takes a continuing interest in the placement of its graduates private practice and governmental service as well as with industry and comerce. The Dean, the Faculty, and the Placement Office cooperate in collecg information from alumni, law firms, and government agencies concerning pportunities in legal positions throughout the country. Senior law students d recent graduates are urged to keep in touch with the Placement Office.

TERANS EDUCATION

e Office of the Registrar, Luther Rice Hall, 2121 Eye Street, N.W., assists dents entitled to educational benefits as veterans or war orphans with any blems which may arise concerning their benefits. This Office also processes tification of enrollment and attendance to the Veterans Administration so monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or war orphans should sult the Office of the Registrar prior to submitting application to the Veter- Administration. All such students should obtain the instruction sheet is- by the Office of the Registrar, which sets forth requirements to be fulfilled re certification of enrollment can be made to the Veterans Administration, which includes other information of general interest.

he Veterans Administration is at 2033 M Street, N.W., Washington, D.C. 21.



COURSES OF INSTRUCTION

THE COURSES OF INSTRUCTION listed below are subject to change. The University reserves the right to withdraw any course announced.

The number of hours of credit given for the satisfactory completion of a course is indicated in parentheses after the name of the course. Thus, a year course giving two hours of credit each semester is marked (2–2), and a semester course giving two hours of credit is marked (2).

In most courses, a final examination is held during the examination period, and the grade in the course is determined in large part by that examination. These courses are parenthetically marked "Examination."

Courses that require the preparation of a major research paper in lieu of an examination are parenthetically marked "Research Paper." The satisfactory completion of such a paper by a student individually will satisfy the Legal Writing curriculum requirement for the J.D. degree.

Courses parenthetically marked "Problem Assignments," "Writing Assignments," "Take-home Examination," or "Choice of Paper or Examination" indicate the nature of the method planned by the instructor for determining in major part the grade he will give for the course. A course marked with any of these designations will not satisfy the Legal Writing curriculum requirement for the J.D. degree.

Day classes begin at 9:10 a.m. and run throughout the entire morning and afternoon. Evening classes begin at 5:50 p.m. Many examinations for both day and evening classes may be given in the afternoon only. Examinations for day students may be held in the evening only.

A parenthetical designation at the end of a course description indicates whether the course is scheduled to be offered in the spring or fall semester or the summer sessions, and also usually whether it will meet in the day or evening. When a double-numbered course is designated "Academic year," the first half of the course is scheduled to be offered in the fall, the second half in the spring. Courses with no parenthetical designation indicating time of offering are not scheduled to be given during the 1972 summer sessions or the 1972–73 academic year.

COURSES FOR JURIS DOCTOR CANDIDATES

Required courses are numbered from 201 to 300. Courses numbered from 301 to 400 are normally taken by second- and third-year students. Courses numbered from 401 to 600 are generally more advanced. Second-year students may take courses numbered above 400 only with the permission of the Dean. Third-year students are encouraged to take one course numbered above 400 each semester, and may take more than one such course with the permission of the Dean.

REQUIRED COURSES

203–4 **Contracts I–II** (4–2) Nash, Freedman, Cibinic, Pock, Ginsburg

Legal remedies of contracting parties, including damages in contract and quasi-contract, specific performance, reformation, recission, remedies in tort; acts creating and terminating contractual rights, including offer and acceptance, mistake, problems of proof; function of consideration; conditions; assignments; third-party beneficiaries; effect of changed circumstances; protection of the client's interests upon breach or threat of breach by the other party. Emphasis on problems of analysis, draftsmanship, and versary method. (Examination) (Academic year—day and evening)

207 **Torts** (4) Merrifield, Seidelson, Park, Banzhaf, Schwartz, Sirulnik

Liability for harm to person or property. Intentional torts, negligence, nuisance, products liability, misrepresentation, defamation, and invasion of privacy; fault and other basis for shifting losses; causation; damages; effects of liability insurance; problems under Federal Tort Claims Act. (Examination) (Fall—day and evening)

211 **Property** (4) Starrs, Schiller, Brown

Basic concepts of personal property. Real property: historical background of the law of estates and conveyancing, types of estates, dower and curtesy, landlord and tenant relationship, concurrent estates, future interests at common law and after the Statute of Uses; introduction to modern conveyancing—the real estate contract, the deed, the recording system, methods of title assurance. (Examination) (Fall—evening; spring—day; summer 1972)

212 **Constitutional Law** (4) Dixon, Miller, H. Green, Mayo

Basic principles of American constitutionalism; judicial function in constitutional cases; implementation of doctrines of separation of powers, federalism, limited government; development and exercise of national powers; introduction to civil rights and liberties. (Examination) (Spring—day and evening)

215 **Criminal Law and Procedure** (4) Starrs, Allen, Robinson, Ferster

Origin and purposes of criminal law; elements of criminal liability: mental disorders; crimes against the person, property, and against both: statutory offenses; criminal procedure, with consideration of Federal Rules of Criminal Procedure. (Examination) (Fall—day; spring—evening)

218 **Civil Procedure** (4) Sharpe, Schwartz, Park, Ferster, Kayton

Mechanics of litigation—rules which govern the process by which rights and duties studied in substantive law courses are enforced; pleadings, discovery, pre- and post-trial motions, jurisdiction and venue, equity jurisdiction and trial by jury, former adjudication. Emphasis on Federal Rules of Civil Procedure, but principles and main problems indigenous to all procedural systems are developed. (Examination) (Spring—day and evening)

220 **Legal Research and Writing** (2) Seidelson and Staff

Introduction to and practical experience in the use of a law library; instruction and practice in legal writing, including a memorandum and appellate court brief; instruction and experience in the preparation and argument of an appellate court case. The grade *CR* (credit) or *NC* (no credit) is given for this course. (Fall—day and evening)

232 **Evidence** (4) Seidelson, Robinson, Freedman

Preparation and presentation of evidence, including proof of writings; qualification and examination of witnesses with emphasis on impeachment; privilege; opinion testimony; determination of relevancy; demonstrative, experimental, scientific evidence; application of the hearsay rule. (Examination) (Spring—day and evening; summer 1972)

ELECTIVE COURSES

302 **Admiralty** (2) Sharpe

Doctrines originating in admiralty courts—prize, maritime, liens, salvage, general average, negligence in ship collisions and otherwise, maintenance and care, unseaworthiness; maritime law from legislative origins—personal injury and death remedies, limits on shipowners' liability, regulation of carriage of goods and persons; admiralty jurisdiction and maritime law in the federal system. (Examination) (Fall—day)

303 **International Law and World Order** (3) Mallison

Traditional content of introductory course in international law presented in context of values and institutions of world community; emphasis upon national states as participants in decision-making processes with consideration also of individuals, international public organizations, political parties, pressure groups, private associations; analysis of range of available sanctions; roles and effects of international agreements under United States Constitution; introduction to the law of war. Complements but does not repeat material in Law 391. (Examination) (Fall—day and evening; summer 1972)

307 **Comparative Law** (3) Albert, Liebesny

A general introduction to the world's main legal systems with emphasis on civil law. Comparative study of the administration of justice, procedural problems, and selected substantive legal institutions. (Examination) (Spring—day)

309 **Conflict of Laws** (3) Dixon, Seidelson, Pock

Legal problems arising from occurrences transcending state or national boundaries; jurisdiction; foreign judgments; constitutional influences; theoretical bases of choice of law principles and their application to specific fields, including torts, contracts, property, family law, administration of estates, business associations. (Examination) (Fall—day and evening; summer 1972)

311 **Agency and Partnerships** (2) Sharpe, Schiller

Legal principles concerning association in business by agency, partnership, other unincorporated forms, and corporations; creation, form and nature of agency, partnership and corporation; basic principles of agency and partnership and introductory related principles of corporation law. (Examination) (Spring—day and evening; summer 1972)

312 **Corporations** (4) Kirkpatrick, H. Green, Stevenson

Corporate law, with emphasis on operations and financing of corporations. Control of corporations, action by corporate directors, officers, shareholders. Control devices. Directors' and shareholders' duties of care and loyalty, insiders' transactions in shares of the corporation. Derivative suits, kinds of shares, dividends, corporate distributions. (Examination) (Fall—day; spring—evening; summer 1972)

313 **Sales and Sales Financing** (2) Albert, Rothschild, Ginsburg

Provisions of the Uniform Commercial Code relating to sale and distribution of goods, including bulk transfers, warehouse receipts, bills of lading and other documents of title; particular attention to secured transactions and financing devices utilized in this connection. (Examination) (Fall—day and evening; summer 1972)

314 **Commercial Paper, Check Collection, and Banking** (2) Albert, Rothschild

Classic view of negotiable instruments as codified by Article III of the Uniform Commercial Code. Check collection: the system in theory as expressed in Article IV of the Uniform Commercial Code and the system in practice; Federal Reserve regulations, Clearing House agreements, and automation systems. The dual banking system, work of the Comptroller General and the Federal Reserve Board. Legal problems concerning interest and the checkless society. (Examination) (Spring—day and evening; summer 1972)

318 **Creditors' Rights** (3) Kirkpatrick

Creditors' remedies outside bankruptcy—compositions, agreements, general assignments; bankruptcy proceedings under the federal statute, administration, discharge, the position and powers of the trustee, preferences; corporate reorganization under Chapter X of the Bankruptcy Act. (Examination) (Fall—day and evening)

321–22 **Current Decisions** (2–2)

Limited to members of the student staff of the *Law Review*. A maximum of 4 semester hours of credit may be earned in these courses: Law 321–22 and Law 346. The grade *CR* (credit) or *NC* (no credit) is given for this course. (Academic year—day and evening)

325–26 **Trusts and Estates I–II** (3–3) Weaver, Kurtz

Noncommercial transfers of wealth at death or during life. Law 325: essential elements and formalities for creation of trusts and execution of wills, revocation and alteration, grounds for contest, limits on property owner's power to control, intestate succession. Law 326: dispositive provisions, common questions of construction, future interests problems, administration of estates and trusts, charitable trusts. Prerequisite to Law 325: Law 211; to Law 326: Law 325. (Examination and Problem Assignments) (Academic year—day and evening; summer 1972—Law 325)

327 **Modern Real Estate Transactions** (2) Schiller, Brown

Advanced problems in conveyancing; private control of land use—easements, covenants, equitable servitudes; planning and zoning—the forms of zoning, appraising the purposes of zoning ordinances, municipal authority to zone against the will of other governments, due process in zoning matters, nonconforming uses. (Examination) (Spring—day)

329 **Unfair Trade Practices** (3) Weston, Harris

Unfair trade practices at common law and under statutes; trademarks, trade names; copyright law; misappropriation of ideas; protection of competitors and consumers against false advertising under Federal Trade Commission Act; resale price maintenance under state Fair Trade Acts; state sales-below-cost statutes; Robinson-Patman Price Discrimination Act.

miscellaneous business practices. (Examination) (Fall—day and evening)

330 **Federal Antitrust Laws** (3) Weston, Kirkpatrick

Sherman and Clayton Acts, related statutes. Price-fixing agreements and other types of trade restraints considered under Section 1; monopolizing considered under Section 2 of the Sherman Act. Mergers and tie-in sales; other activities under the Clayton Act. All types of business conduct raising questions under the antitrust laws, including trade association activities, exclusive-dealing arrangements, boycotts, patents and copyrights. (Examination) (Spring—day and evening)

331 **Product Liability** (2) Sastri

Development of the concept of product liability and consumer's remedies. Specific problems and processes in evaluation of risk and benefit encountered in government regulation of dangerous and defective products. Survey of civil actions for harm resulting from defective and dangerous products with reference to parties and proof in negligence, warranty, nuisance, fraud, misrepresentation, and other cases. Problems associated with hazard identification, insurance, and industry self-regulation. Review of Consumer Product Safety Act and current legislation dealing with injuries and remedies in specific areas. (Research Paper) (Fall—evening; spring—day)

332 **Federal Jurisdiction** (2) Sharpe, Schwartz, Albert, D. Green

Relationship of federal courts to Congress and to the states, through analysis of cases dealing with federal judicial functions (including problems of advisory opinions, standing to litigate, justiciability), federal questions in federal courts, federal review of state court decisions (including relation between state and federal substantive law, procedural problems in exercising review, application of law to fact). Sharpe, Albert—(Examination); Green—(Problem Assignments) (Fall—day and evening; summer 1972)

334 **Advanced Criminal Procedure** (2) Starrs, Robinson, Ferster

Decision to arrest, prosecutive discretion, bail, the preliminary hearing, right to a speedy trial, discovery, plea bargaining, publicity, post-conviction procedures. Starrs—(Examination and Problem Assignments); Robinson, Ferster—(Examination) (Fall—day and evening; summer 1972)

335 **Jurisprudence** (2) Mayo, R. Kramer

Basic jurisprudential concepts; nature of law; development of legal institutions; jurisprudential schools—natural law, analytical, historical, sociological, functional; law and logic; law and justice; the judicial process; legislative, executive, administrative decision-making; impact of politics, economics, and scientific advance on legal systems; contemporary trends in jurisprudential thought. Mayo—(Examination); Kramer—(Writing Assignments) (Fall—evening; spring—day)

336 **Taxation—Federal Income** (3) Weaver, Hambrick, Speiller

Survey of substantive provisions of federal income tax law, including concept of gross income, provisions affecting taxation of family and individual transactions, limitations on allowable deductions, sales and dispositions of property, problems of capital gains taxation, nontaxable exchanges. Weaver—(Examination and Problem Assignments); Hambrick—(Examination) (Fall—day and evening; summer 1972)

338 **Taxation—Federal Estate and Gift** (2) R. Kramer, Hambrick

Survey of substantive provisions of federal estate and gift tax laws, including inter vivos transfers, transfers in contemplation of death, joint interests, life insurance proceeds, property subject to powers of appointment, marital deduction and split gifts; tax procedure. (Examination) (Fall—day and evening)

339 **Collective Bargaining and Labor Arbitration** (3) Merrifield, Rothschild

Collective labor agreement: content, negotiation, administration through grievance procedure and arbitration; problems in settlement of labor disputes. Merrifield—(Examination and Problem Assignments); Rothschild—(Problem Assignments) (Spring—day and evening; summer 1972)

340 **Taxation—Federal Income, Corporations and Shareholders** (3) Hambrick, Tannenwald, Tucker

Continuation of Law 336. Primary emphasis on corporate-shareholder relationships. Problems of corporate dividends, redemptions of stock, distributions in partial and complete liquidation, stock dividends, bail-outs, and dividends in kind closely analyzed. Federal income tax problems involved in the formation of corporations, the sale of corporate businesses (including collapsible corporations), mergers and acquisitions, and corporate divisions. Students who have received credit for former Law 337 cannot receive credit for Law 340. Prerequisite: Law 336. (Examination) (Spring—day and evening)

341 **Labor Law** (3) Merrifield, Albert, Rothschild

Law governing labor-management relations, organizations and representation of employees, regulation of economic weapons, enforcement of collective bargaining agreements, interunion and intra-union relations. (Examination) (Fall—day; spring—evening; summer 1972)

344 **Legal Writing** (1 or 2) Staff

Preparation of a research paper under the supervision of a full-time member of the Faculty who will determine, prior to registration, whether the work required for the topic selected justifies one or two semester hours of credit. If elected for one hour of credit, this course may be repeated to meet the legal writing requirement for the degree. Approval of the faculty member is required prior to registration. (Research Paper) (Fall and spring—as arranged; summer 1972)

345 **Students-in-Court** (1 or 2) Staff

Open only to third-year law students. In the D.C. Law Students in Court program, students represent indigent litigants in the Small Claims and Landlord-Tenant divisions of the D.C. Superior Court. Their duties include client interviews, investigation, settlement negotiations, preparation and argument of motions, and conduct of trials. In the Student Legal Aid Bureau's Maryland Practice and U.S. Attorney programs, students help to prepare and try misdemeanor cases for the Public Defender Service (Maryland) and U.S. Attorney's Office (D.C.) under the supervision of the defense attorney or Assistant U.S. Attorney assigned to the case. Students must make application for all three programs. Application must be made during April of the preceding academic year for students wishing to participate in the D.C. Law Students in Court program; preference is given to students with a cumulative-grade average above 75 who have participated in clinical or extracurricular activities or employment which provide background for litigation and working with indigents.

Students may participate for the summer, for the full academic year, or for the summer plus one other semester. Applications for the Maryland Practice and U.S. Attorney programs are accepted at the beginning of each semester. A maximum of 4 semester hours of credit may be earned for both Law 345 and Law 385. The grade *CR* (credit) or *NC* (no credit) is given for this course. (Fall and spring)

346 **Credit Activities** (1 or 2) Staff

Work done in connection with the Legal Aid Bureau, the Law Students Civil Rights Research Council, the *Journal of International Law and Economics*, or the Moot Court Competition—under the supervision of the faculty adviser, who will determine, prior to registration, whether the work required justifies one or two semester hours of credit and whether the student has complied with all prerequisites. May be repeated for credit not to exceed 6 semester hours. Students registering for Law 346 who have taken or plan to take Law 399 are reminded that a maximum of 10 semester hours of credit may be earned in these courses—Law 346, 399, 459, 509, and 579. A maximum of 6 semester hours of credit may be earned in these courses—Law 321–22 and 346. The grade *CR* (credit) or *NC* (no credit) is given for this course. (Fall and spring)

347 **Insurance** (2) Schiller, Pock

A primary risk distributing medium and the rules by which legislative, administrative, judicial bodies seek to promote its benefits and avert its dangers. Includes insurance marketing, insurable interest, subrogation, transfer of insurance benefits to nonpolicyholders, coverage and other insurance policy provisions, disposition of claims. (Examination) (Spring—day and evening; summer 1972)

348 **Domestic Relations** (2) Seidelson, Potts, Ferster, Albert

Marriage, annulment, and divorce; adoption and custody of children; economic relations. Seidelson, Potts—(Examination); Albert, Ferster—(Problem Assignments) (Fall—evening; spring—day; summer 1972)

349 **Local Government Law** (2) Reitze

Decision-making processes in metropolitan and local communities; types and objectives of city, county, special-function local government units; intergovernmental relations; original organization and changes; personnel; local lawmaking; responsibility in tort; introduction to community planning. (Examination) (Fall—day and evening)

351 **Law and Accounting** (2) Cibinic, Ginsburg

Study of fundamental accounting principles with emphasis on corporation accounting; legal and accounting implications of specific items in financial statements of corporations; inventory adjustments; corporate transactions, distributions, capital adjustments. Strongly recommended for students who have had no accounting. (Examination and Problem Assignments) (Fall—evening; spring—day)

355 **Government Contracts** (2) Nash, Cibinic

Survey of basic law underlying government procurement, basic power and limitations on federal government in entering into contracts, administrative and legislative policies governing these contracts, advertised and negotiated procurement procedures, forms of contracts and clauses used. Law 431 *Government Procurement Law* is the substantial equivalent of this course. (Examination and Problem Assignments) (Fall—day)

359 Patent Law (3) Kayton, Harris

Law of patents subsequent to issuance of patent; nature of patent as property and as a legal instrument; validity—novelty, nonobviousness, commercial success; infringement—direct and contributory, doctrine of equivalents and file-wrapper estoppel. Substantive concepts introduced in order approximating patentee's and infringer's cases in litigation. Designed for students intending to specialize in patent law; knowledge or experience in patent law helpful but not prerequisite. (Examination) (Fall—evening)

362 Patent Office Practice (2) Kayton, Harris

Substantive and procedural law of patents leading to issuance of patent, mainly related to proceedings before U.S. Patent Office. Obtaining and preserving earliest possible patent filing date; continuing applications, res judicata, novelty and nonobviousness requirements; substantive rules of priority of invention and related affidavit practice; nature of claims and formal defects; restriction and double patenting. Designed for students intending to specialize in patent law. Prerequisite: Law 359 or the equivalent in experience. (Examination) (Spring—evening)

370 Selective Service Law (2) Ginsburg

Analysis of the Selective Service Act and implementing regulations, as interpreted by the courts. Discussion of selection (including the lottery), exemptions and deferments, special problems of conscientious objectors, procedures within the Selective Service, court review, punitive reclassification, medical and psychiatric standards and procedures, legislative proposals, and problems in prosecuting and defending draft cases. (Examination and Problem Assignments)

372 Administrative Law (3) Miller, Park, Banzhaf

Study of the administrative process in executive and independent regulatory agencies; emphasis on judicial review. Formal and informal decision-making, investigation, planning, and public administration functions of the agencies as related to their legal limits and to the roles of lawyers in government and private practice. Relationships of agencies to the executive and legislative branches, to public and private interest groups, and to the social, political, and economic aspects of various philosophies of government regulation. Miller—(Research Paper); Park—(Examination and Writing Assignments); Banzhaf—(Examination) (Fall—day; spring—evening)

375 Remedies (3) Cibinic, Ginsburg, D. Green

(Replaces former Law 374 Equity (2) and Law 376 Restitution (2))

Development and use of judicial remedies that give relief for past or threatened injuries to interests of personalty and property. Remedial approaches include compensatory and punitive damages, injunctions, unjust enrichment, constructive trusts, equitable liens, tracing, subrogation, and specific reparation. Emphasis on comparing remedial options in fraud, mistake, duress, breach of contract, and abuse of fiduciary relationships. Cibinic, Ginsburg—(Examination); Green—(Problem Assignments) (Spring—day and evening)

377 Legislation (2) Ferster

Legislative process and roles of participants in the process; operation of United States Congress and state legislatures, including fact finding, organization, procedure. Statutory interpretation emphasized to provide foundation for more advanced courses. (Examination) (Spring—day)

380 **Environmental Law I** (3) Reitze

Government control of the environment, solid waste management, water and air pollution control, control of the electric power industry, common law remedies, the urban environment, and transportation problems. (Examination) (Fall—day; spring—evening)

381 **Environmental Law II** (3) Reitze

Survey of private water law, river basin management soil conservation, rural development and resources protection, public land law, recreation on public lands, forestry and grazing, public mining law, ocean environmental law, public regulation of the oil and gas industry, and selected problems in international resources management. (Examination) (Spring—day)

385 **Trial Practice Court** (2) Jackson, Herrick, Ryan, Kendrick, Skinker, Stevas, Altshuler, Nunzio, McArdle

Trial of assigned cases, trial tactics and techniques, pre-trial and courtroom procedures pursuant to federal rules. Students may repeat this course once for credit. A maximum of 4 semester hours of credit may be earned for both Law 385 and 345. Prerequisite: forty-two semester hours, including Law 218. Prerequisite or concurrent registration: Law 232. The grade *CR* (credit) or *NC* (no credit) is given for this course. (Fall and spring—day and evening)

388 **Appellate Practice and Procedure** (2) Freedman

Students participate in preparing an actual criminal case on appeal, starting with review of trial transcript and culminating with preparation of brief and oral argument before U.S. Court of Appeals for the District of Columbia Circuit or the U.S. Supreme Court. Appellate practice and procedure studied through texts; consultation with appellate judges, law clerks, and attorneys with cases pending on appeal; observation of arguments in the Supreme Court and the Court of Appeals. Admission by permission of instructor. (Research Paper)

389 **Medicine for Lawyers** (2)

Basic rudiments of medicine as encountered in a malpractice suit, divorce case, et. al., including medical terminology which will enable the lawyer to communicate more effectively with medical specialists. (Examination and Writing Assignments)

390 **Forensic Medicine** (2) Sharpe, Head

A survey of interprofessional relations between physicians and lawyers in the office, the hospital, and the courtroom, with incidental attention to laboratories, legislatures, and administrative agencies. Undergraduate law students and second-year medical students study how their professions accommodate conflicts between economics and ideals, and how they exercise judgment in applying their technical skills. (Examination) (Fall—day and evening)

391 **United Nations Law and World Order** (2) Mallison

Introduction to international law through study of law and practice of United Nations Charter; structure and process of decision of United Nations; maintenance of international peace and security—peaceful settlement of disputes and national and collective self-defense; formualtion and implementation of human rights. Complements but does not repeat the material in Law 303. (Examination) (Spring—day and evening)

394 **Women and the Law** (2) Kessler, Ross, Stanley, Wolf

An examination of the treatment of women in all areas of the law and of legal remedies for sex discrimination. Emphasis on constitutional law, criminal law, discrimination in the media, education, and employment. Students choose clinical projects or research papers on which to focus the semester's work. Enrollment limited to 30 students. (Research Paper) (Fall and spring—evening)

395 **Public Participation Strategies: Tax Policy** (2) Stanton

Study of the development of legal strategies with the administrative and legislative processes; emphasis on the formulation of tax policy. Specific cases will be studied for analysis of potential alternative strategies for constructively affecting the decision process. Two-thirds of the course will be devoted to the study of past cases, the last third to the formulation of strategies to influence pending decisions. Open to a limited number of third-year students. The final grade will be based upon class participation and the quality of strategy formulated to deal with a specific problem selected by the student with the approval of the instructor. (Writing Assignments) (Fall—day)

396 **Legal Activism** (3) Banzhaf

Study of the use of law and the legal process, not as a technique for resolving disputes between identified individuals and/or organizations, but as a powerful tool for ameliorating problems of general public interest. Principles and techniques of legal activism, maximum effectiveness of public interest actions, how these actions differ from conventional legal practice. To learn these techniques effectively, and to test and develop their proficiency in their use, students will form clinical project groups and initiate or participate in a legal or law-related activity directed against a public interest problem of their own choosing. (Fall—day)

399 **Clinical Law Work (arr.)** Staff

Projects involving litigation, research, or public interest activities of a legal nature (including aid to indigents, support of public interest non-profit corporations, and support of governmental agencies or courts) may be initiated and will be supervised by a faculty member. Projects must be approved in advance by the Law Center Supervisory Committee (three members) both as to whether the project is appropriate and as to the number of semester hours of credit to be granted. A maximum of 10 semester hours of credit may be taken in one or two semesters. If students elect Law 346, *Credit Activities*, or Law 459, *Problems of the Consumer*, or Law 509, *Clinical Studies in Environmental Law*, or Law 579, *Clinical Studies in Urban Law*, the number of semester hours of credit they receive for these courses will be deducted from the maximum of 10 hours they can receive for Law 399. This course is open to a limited number of third-year law students. The grade *CR* (credit) or *NC* (no credit) is given for this course. (Fall and spring)

ADVANCED COURSES

ADMINISTRATIVE LAW: ECONOMIC REGULATION

Faculty Advisers: A.S. Miller, R.E. Park, G.E. Weston

402 **Executive Function** (2) Miller

Executive branch in constitutional theory; major trends in development of

executive-administrative function; organization of executive branch; relationship of executive to Congress and judiciary; policy-making procedures within executive branch including role of Bureau of the Budget in national policy planning; case studies in exercise of executive power in such functional areas as national defense, race relations, national economy, foreign economic relations; role of law and lawyers in executive decisional and implemental process. (Research Paper) (Spring—day)

403 **Public Economic Policy and the Law** (2) Snow

Interrelation of law and economics in such subject-matter categories and decisional contexts as economic regulation of industry, fiscal policy planning, government research and development practices, foreign trade and investment, and public spending priorities. (Research Paper) (Fall—evening)

404 **Securities Regulation** (2) H. Green, M. Cohen, Mathews

State and federal laws governing offering and distribution of securities to the public by corporate issuers and others, regulation of securities markets, rights and liabilities of purchasers under such statutes. Emphasis on statutes administered by Securities and Exchange Commission. (Take-home Examination) (Fall—evening; spring—day)

405 **Regulation of Securities Markets** (2) Rotberg, Eisenberg

Operation of over-the-counter and exchange markets, including competitive and monopolistic practices in each market; relationship of antitrust laws and securities regulations to concept of a free and open market place; role of regional exchanges and third market in providing competitive element in market; advantages and disadvantages of a fragmented market; minimum fee structure, rebates and their effect on merchandising of securities and financial soundness of industry; use and availability of economic data in evaluating performance of market place. The seminar will examine matters directly of interest to graduate law students, lawyers, economists, and political scientists. (Take-home Examination) (Spring—evening)

407 **Seminar: Regulation of Transportation I** (2) Hill

History of development of modes of transportation in the United States; economic problems and growth of regulatory legislation and philosophy; the congressional power to regulate; the scope of federal regulation; division of regulatory authority between federal and state governments; introduction to principles of certification and rate-making. (Examination) (Fall—evening)

408 **Seminar: Regulation of Transportation II** (2) Hill

Principles of certification of rail, motor, water, and air carriers; elements and principles of rate-making; comparison of problems, procedures, and regulatory philosophies of the various regulatory agencies. (Examination) (Spring—evening)

412 **Food and Drug Law** (2) Goodrich, Kaplan, Kleinfeld

The Federal Food, Drug, and Cosmetic Act, and related laws. Consumer, government, and industry viewpoints. (Choice of Paper or Examination) (Spring—evening)

413 **Public Policy and Mass Media** (2) A. Kramer, Cohn

Institutional structure of mass media and their interrelationships; psycho-

logical aspects of mass communications; continuing adjustments am public interest goals, the economic system, and technological devel ments; influence of and controls exercised by government, other inst tions, and private groups; conflict between freedom of speech of media and other major community interests; the media's relationships the interests of dissident and minority groups and the access of th groups to the media. Cohn—(Research Paper) (Spring—day a evening)

414 **Regulated Industries** (2) Pa

Substantive problems of business regulation in terms of natural monop lies, licensed industries, subsidized industries, and safety regulation. Typ cal problems raised include the role of intervenors, the impact of regula tion upon management and market behavior, the uses and abuses economic evidence, the role of agencies' staffs, interagency planning an regulation, and the effects of judicial and legislative review. Each studen selects one industry and develops his insight into economic regulation terms of that industry's firms, market structure, growth and developmen trade associations, and regulatory agencies. (Research Paper)

417 **Seminar: Trade Regulation** (2) Weston

Group study of current problems relating to unfair trade practices and federal antitrust laws. (Research Paper) (Spring—evening)

Master of Laws candidates in the area of Administrative Law: Economic Regulation who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

329 *Unfair Trade Practices*
330 *Federal Antitrust Laws*
372 *Administrative Law*

OTHER RELATED COURSES

451 *Federal Programs in Urban Poverty*
493 *Intergovernmental Aspects of Technological Change*
494 *Use and Control of Atomic Energy and Space Technology*
505 *Intergovernmental Relations I*
506 *Intergovernmental Relations II*
571 *Land Development Planning*
594 *Seminar: Privacy*

CORPORATION LAW

Faculty Advisers: H.P. Green, R.B. Stevenson, Jr.

422 **The Modern Corporation** (2) Miller

Analysis of the nature and role of the large business corporation in the American political economy; models of the corporation; the transnational or multinational enterprise; the concept of accountability as applied to corporate activities; reasons for the growth of large corporate enterprise; relationships of the "supercorporations" to other centers of decentralized power and to the government; the corporation as the basic planning unit of the American economy; application of the Constitution to the corporation. (Research Paper) (Fall—day)

424 **Business Planning** (2) H. Green, Stevenson, S. Cohen, Seigel, Tucker

Integrated study of corporate, financial, tax, accounting, and SEC aspects of the following: organization of a small corporation; organization of a public corporation; stock dividends, recapitalization, and stock repurchases in the context of conflict between active stockholders of a close corporation and the family of a deceased active stockholder, corporate liquidations; corporate mergers and acquisitions; and divisions of corporations. Prerequisite: Law 312 and 336. Green, Stevenson—(Problem Assignments); Cohen, Seigel—(Writing Assignments) (Fall and spring—day and evening; summer 1972)

427 **Legal Aspects of International Business Transactions** (2) Nurick, Guttentag

U.S. law and practice, including current tax problems and U.S. restrictions on investment; brief comparison with British and civil law systems; international law, international contracts, choice of law; currency considerations; effect of SEC laws and regulations; international trade, including GATT and reciprocal trade arrangements; sources of finance, both United States and foreign, private and public, including international organizations; protection of property, settlement of disputes, and selected case studies. In addition to the regular lecturers, there will be guest lecturers in various specialties. Emphasis on current problems in international trade and investment. Prerequisite: Law 303. (Choice of Paper or Examination) (Spring—evening)

Master of Laws candidates in the area of Corporation Law who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Master's program.

312 *Corporations*
313 *Sales and Sales Financing*
329 *Unfair Trade Practices*
330 *Federal Antitrust Laws*
340 *Taxation—Federal Income, Corporations and Shareholders*

THER RELATED COURSES

331 *Product Liability*
417 *Seminar: Trade Regulation*
431 *Government Procurement Law*
525 *Copyright Law*
526 *U.S. and International Trademark Practice*
540 *Comparative Conflict of Laws and Transnational Legal Problems*
541 *Seminar: European Common Market*
555 *Taxation—Special Corporation Problems*
562 *Income Taxation of Foreign Business and Investment*

VERNMENT PROCUREMENT LAW

ulty *Advisers:* J. Cibinic, Jr., G.J. Ginsburg, R.C. Nash, Jr.

431 **Government Procurement Law** (2) McIntire

Survey of the law pertaining to government procurement, including an analysis of the unique features of government contracting and a discus-

sion of the functions of Congress, the executive branch, and the courts in the procurement process. Law 355 *Government Contracts* is the substantial equivalent of this course. (Examination) (Fall—evening)

432 **Formation of Government Contracts** (2) McIntire

Detailed coverage of the rules and practices followed in arriving at contracts between the government and private parties. Comparison in depth of advertised and negotiated procurement and analysis of the techniques used in pricing and arriving at the terms of such contracts. (Examination) (Spring—evening)

433 **Performance of Government Contracts** (2) Nash, Cibinic

Discussion of the substantive legal problems that most frequently arise during the performance of government contracts. Interpretation of specifications and the most generally used contract clauses, and analysis of the rights of the parties when performance in accordance with the terms of the contract is not obtained. (Examination and Problem Assignments) (Spring—evening)

434 **Government Contract Claims and Litigation** (2) Nash, Ginsburg

Analysis of the methods which can be used by the parties to a government contract to obtain legal relief, including detailed coverage of the disputes procedure, actions for breach of contract, and forms of equitable and extraordinary relief. (Examination and Problem Assignments) (Fall—evening)

435 **Seminar: Government Contracts** (2) Nash, Cibinic, Ginsburg

Research and discussion of selected problem areas. (Research Paper) (Summer 1972)

OTHER RELATED COURSES

402 *Executive Function*
424 *Business Planning*
427 *Legal Aspects of International Business Transactions*
442 *Labor Standards and Equal Employment*
494 *Use and Control of Atomic Energy and Space Technology*
495 *Legal Protection against Technological Hazards*
505 *Intergovernmental Relations I*
506 *Intergovernmental Relations II*
535 *Negotiation: Concepts and Techniques*

LABOR LAW

Faculty Advisers: J.M. Albert, L.S. Merrifield, D.P. Rothschild

441 **Seminar: Disability Problems** (2) Doherty

(Formerly Seminar: Disability and Retirement Problems)

Workman's compensation law, extension of no-fault principle into motor vehicle area, and national health problems. (Examination) (Fall—evening)

442 **Labor Standards and Equal Employment** (2) Ginsburg

Analysis of the Fair Labor Standards Act, its scope and exemptions, the Civil Rights Act and other labor statutes; the laws establishing

labor standards for government contracts, including the Davis-Bacon Act, Walsh-Healey Act, Service Contract Act, and Work Hours Act; the role of the Department of Labor, the Comptroller General, and the contracting agencies in interpretation, administration, and enforcement of these statutes. (Examination) (Spring—evening)

443 **Labor Relations in the Federal Service** (2) Tobias

Survey of labor relations in the federal service as governed by Executive Order 11491. Emphasis on the role of the Civil Service Commission, the Department of Labor, the Congress, and the President in the development of collective bargaining relationships between unions and the federal government. (Research Paper) (Fall—evening)

444 **The Individual and His Union** (2) Gold

Study of the legal relations between unions and their members with special emphasis on the right to fair representation, the right to union membership, compulsory union membership, the imposition of discipline upon union members, reporting requirements, the conduct of internal union elections, the fiduciary duties of union officers, the imposition of trusteeships, the regulation of racketeering, and political action of unions. Prerequisite: Law 341. (Examination) (Summer 1972)

445 **Labor Relations in State and Local Governments** (2) Jascourt

Analysis of the shifting and emerging legal concepts that affect the form, scope, and consequences of labor relations in schools and colleges and in municipal, county, and state governmental bodies. Survey of the varied statutory and de facto labor relations systems and their impact on the development of bilateral decision-making. Examination of (1) problems caused by the concurrent existence of civil service laws and the diffusion of governmental authority, (2) impasse resolution, and (3) strikes and other concerted activities. (Problem Assignments) (Spring—evening)

447 **Seminar: Labor Law** (2) Merrifield

Group study of contemporary problems in labor law. (Research Paper) (Spring—day)

49–50 **Seminar: Labor Litigation** (1–1) Gold

Intensive study of recent Supreme Court and appellate court decisions in the area of labor law; special emphasis on the contrasting variables which influence the respective decision-making processes of the National Labor Relations Board and the courts. Particular attention to labor law cases pending before the Supreme Court for decision during the current term. Analyses of the briefs filed in pending cases; attendance at oral argument; post mortems of the arguments and decisions, with classroom participation by attorneys involved in some cases. Grades and credit for both halves of the course assigned only on completion of the second half. Prerequisite: Law 341. (Research Paper) (Academic year: every other week—evening)

r of Laws candidates in the area of Labor Law who have not taken the ing courses or their equivalent as part of a Juris Doctor or Bachelor of program should include them in their Master's program.

339 *Collective Bargaining and Labor Arbitration*
341 *Labor Law*

OTHER RELATED COURSES

459 *Problems of the Consumer*
460 *Current Problems in Civil Rights*
461 *Social Welfare Legislation and Administration*

LAW AND POVERTY

Faculty Advisers: R.S. Kuhn, D.P. Rothschild, J.E. Starrs

451 **Federal Programs in Urban Property** (2) Mire

Students are given a chance to observe at first hand the problems inher-ent in implementing a federal policy to alleviate poverty through legisla-tion. Students are assigned to work with individual poverty agencies in the District of Columbia on matters relating to the federal funding agen-cies. Discussions focus on various aspects of poverty law problems as lawyers deal with them—from conception of the legislative program, to Congressional debate, to administrative policies, to fund distribution, to litigation. (Research Paper) (Fall—day)

458 **Housing the Poor** (2) Starrs

An in-depth analysis of current housing problems, including three main subjects: (1) Discrimination in housing. (2) Landlord and tenant rela-tionship, including a discussion of leases and their clauses and of the evic-tion process, tactical and substantive defenses to it, and affirmative ave-nues of redress on behalf of the tenant; public housing and building code enforcement. (3) Home ownership by the poor, including its financing by instruments such as the deed of trust and the installment land contract as well as federal subsidy programs. Admission by permission of instruc-tor. (Research Paper) (Spring—evening)

459 **Problems of the Consumer** (2) Rothschild

Clinical treatment of consumer protection. No regular classes; minimum of 5 hours commitment each week required. Students purchase materials on consumer protection and are divided into project groups for the pur-pose of indicating the problems of the consumer to the community by a campaign of consumer awareness. For example, the National Law Center has negotiated with a commercial TV station to put on a series of "spots" dramatizing these problems, and will also run a "Consumer Help Center." This activity will involve three groups: (1) a group to work with the station on programming, (2) a group to run the Consumer Help Center, and (3) a research group to investigate the results of turning complaints over to the appropriate authority. Another student project will dramatize problems of the consumer by teaching consumer awareness in the public school system in the District of Columbia. Other projects are also avail-able. Students registering for Law 459 who have taken or plan to take Law 399 are reminded that a maximum of 10 semester hours of credit may be earned in these courses—Law 346, 399, 459, 509, and 579. The grade *CR* (credit) or *NC* (no credit) is given for this course. (Fall and spring—day)

460 **Current Problems in Civil Rights** (2) Kuhn, Silard

Uses of law in the effort to achieve racial equality, in areas such as (1) discrimination against minority groups and the poor in land use and zoning, (2) school desegregation, and (3) employment discrimination. The class is divided into groups, each dealing with a problem situation in one of these areas. Students represent fictitious clients, write briefs, and

argue in class before a student panel of judges, which then writes an opinion. Grades are based on these written and oral presentations, plus brief critiques of other groups' presentations. (Problem Assignments) (Spring—day)

461 **Social Welfare Legislation and Administration** (2)

Study of public assistance, social insurance, and medical and legal assistance programs; the socioeconomic status of welfare recipients, the psychological impact of the welfare system, and the "Welfare Rights Movement"; particular legal issues, such as "midnight searches" and the Fourth Amendment, imposition of support obligations on non-fathers through the "Man-in-the-House Rule," imposition of moral behavior standards through welfare denial, right of privacy, and Constitutional issues raised by mandatory training or work requirements. (Research Paper)

462 **Family Law of the Poor** (2)

Consideration of the full range of problems associated with family formation and dissolution among the urban poor and the problems of urban children and their parents: the law of marriage, annulment, divorce, and separation as it affects the poor urban family unit; impact on the family of welfare and public housing eligibility regulations; legal problems associated with common-law marriage, illegitimacy, and meretricious relationships; scope of support obligations and sanctions imposed through welfare denial or eviction from public housing; organization of social services and their role in the solution of family problems; and the lawyer's role in family counseling. (Research Paper)

OTHER RELATED COURSES

441 *Seminar: Disability Problems*
472 *Administration of Criminal Justice*
475 *Law and Criminology I: Search for the Causes of Criminal Behavior*
476 *Law and Criminology II: Society's Responses to the Criminal Offender*
477 *The Police and the Community*
560 *Taxation—State and Local*
571 *Land Development Planning*
575 *Community Economic Development*
590 *Population Control and the Law*
592 *Seminar: Constitutional Law*

LAW, PSYCHIATRY, AND CRIMINOLOGY

Faculty Advisers: R.C. Allen, T.F. Courtless, Jr., E. Ferster

472 **Administration of Criminal Justice** (2) Allen

Consideration and analysis of selected advanced problems in the administration of criminal justice. The subject matter covered will vary from year to year, with concentration in areas of current interest and dynamic change (e.g., right to counsel, arrest and interrogation, search and seizure, prejudicial publicity, discovery, electronic interception, mental impairment). Emphasis will be placed on the role and professional responsibilities of prosecutor and defense counsel and on developmental trends in the law. (Research Paper or Examination)

473 **The Crime Lab, the Forensic Scientist, and the Criminal Lawyer** (2) Starr

Designed to acquaint the student with the operations of a modern crim laboratory and the courtroom acceptability of testimony of forensic scien tists and other evidence on laboratory test results. Identification of in dividuals (fingerprints, palmprints, footprints, voiceprints, anthropological reconstruction, hair identification, and serology), identification of objects (ballistics, handwriting, typewriting, fiber identification, paints, varnishes, glass, wood, and paper), toxicology, pathology, forensic use of the mi croscope and the camera, the coroner and the medical examiner systems, and drug law enforcement. Visual aids, crime laboratory guest lecturers, and field trips to crime laboratories. (Research Paper) (Summer 1972)

475 **Law and Criminology I: Search for the Causes of Criminal Behavior** (2) Courtless

Role which criminological knowledge of crime causation may play in as sisting lawyers to appraise the effectiveness of various alternative social and legal devices in controlling deviant behavior. The search for factors related to criminal behavior will be developed historically, with emphasis on current causal theories developed by various disciplines. Model as well as operational penal codes, sentencing and probation practices, and specialized facilities will be analyzed in terms of their relationship to such casual theories. (Take-home Examination) (Fall—day)

476 **Law and Criminology II: Society's Responses to the Criminal Offender** (2) Courtless

Study of the development and current use of society's three major ap proaches to the handling of offenders: punitive, mechanical, and correc tional. Emphasis on society's changing responses to criminal and delin quent behavior, and research findings concerning effectiveness of these responses. Analysis of treatment strategies to facilitate communication between members of the legal profession and behavior scientists charged with effectuating these strategies. (Research Paper) (Spring—day)

477 **The Police and the Community** (2) Allen, Courtless

Problems and potential of contemporary urban law enforcement: the role and perspective of the police officer; the police *qua* organization; "styles" of law enforcement; law enforcement in the inner city; relationship with ethnic minorities; civil disorder; police-community relations; methods in arrest and investigation; complaint review procedures; science and tech nology in law enforcement; police handling of juveniles; crime and crime statistics. (Problem Assignments) (Spring—day)

478 **Post-conviction Dispositions—Dynamics of the Law of Criminal Corrections** (2) Barkin, Skoler

Study of the statutes, practice, problems, and potentials of the alternatives facing a defendant including mental fitness to proceed to trial, probation, sentencing, parole, correctional institutions, rights of prisoners. Enroll ment limited to 25 students. (Examination) (Fall—evening; spring—day)

479 **Seminar: Criminal Practice** (2) Perazich, Chernoff

For students who expect to be involved in the trial of criminal causes. Weekly classroom sessions with emphasis on clinical training; students will

be assigned to attorneys drawn from the private bar in the District of Columbia as well as from the Public Defender Service, who are actively engaged in the trial of criminal matters. Students serve as investigators, research assistants, and perhaps as co-counsel during the preparation and trial of criminal cases. Active participation in all stages of the criminal litigation including client and witness interviews, plea bargaining, bail proceedings, pretrial motions, and the trial itself. Enrollment limited to 20 third-year or graduate students. Prerequisite: Law 334. (Fall and spring—day)

486 **Seminar: Law and Psychiatry** (2) Allen

Designed to (1) expose the lawyer to some of the constructs of dynamic psychiatry dealing with human personality and behavior, and to relate them to problems encountered in legal practice; (2) provide information —both psychiatric and legal—bearing upon such topics as mental illness and tort liability ("traumatic neurosis," malpractice, commission of torts by mentally ill persons); hospitalization of the mentally ill and mentally retarded; guardianship; ad hoc determinations of incompetency (testamentary, contractual, and donative capacity; capacity to marry, have custody of children; mental illness as a ground for divorce; eugenic sterilization); mental illness and the criminal law (psychiatric evaluations in criminal cases, determinations of competency to stand trial, criminal responsibility); and (3) examine the role of psychiatry in legal settings, including the effective use of the psychiatrist and psychologist as expert witness. (Research Paper) (Fall—day; summer 1972)

487 **Interdisciplinary Seminar on the Juvenile Court** (2) **Ferster**

Sociological, psychological, and psychiatric views on prevention, diagnosis, and treatment; analysis of statutes, court rules, and reported cases pertaining to delinquency and neglect; emphasis on the role of the lawyer in juvenile courts. (Problem Assignments) (Spring—day)

OTHER RELATED COURSES

390 *Forensic Medicine*
591 *Legislative Drafting*
592 *Seminar: Constitutional Law*

AW, SCIENCE, AND TECHNOLOGY

aculty *Adviser:* H.P. Green

491 **Science Policy Formulation** (2) Anderson

Current or recent important governmental decisions in the area of science as they affect the interplay of various government and community interests; the role of law as a constraint, vehicle, or implement; the role of lawyers in the decision-making process. (Research Paper) (Fall—evening)

492 **Seminar: Science and the Legal Process** (2) **H. Green**

Reciprocal relationships between law and science; absorption of scientific concepts into substantive law through adjudication, legislation, and rule-making; techniques and procedures used in handling, developing, and deciding scientific issues. (Research Paper) (Fall—evening)

493 **Intergovernmental Aspects of Technological Change** (2)

Role of technology in breaking down political barriers and leading tergovernmental measures to control or advance technological pr within the United States and on an international basis. Specific leg vices and institutions employed in intergovernmental handling of te logical problems. (Research Paper)

494 **Use and Control of Atomic Energy and Space Technology** (2)

Problems resulting from revolutionary scientific developments of re years. Impact of advanced technologies on the law and legal institut Laws and regulations relating to atomic energy and space including civ uses, licensing, security, international, and patent considerations. search Paper)

495 **Legal Protection against Technological Hazards** (2) Dembling, Bro

The growth and development of law and legal institutions to protect ciety against the hazards inherent in new technologies with particular e phasis on the progress of reconciling the protection of the public with desire for rapid progress. (Research Paper)

OTHER RELATED COURSES

380 *Environmental Law I*
381 *Environmental Law II*
402 *Executive Function*
412 *Food and Drug Law*
413 *Public Policy and Mass Media*
431 *Government Procurement Law*
503 *Natural Resources Law and Policy*
505 *Intergovernmental Relations I*
531 *International Law of Air and Space*
532 *International Law of the Sea*

NATURAL RESOURCES LAW AND ENVIRONMENTAL LAW

Faculty Advisers: J.M. Brown, A.W. Reitze

501 **Land Development Law** (3) Brown

Study of the various techniques relative to land development; the state of the federal government as landlord, vendor, and purchaser; the com petitive private market as a form of planning in comparison to governm mental planning programs; the functions of the lawyer in the modern rea estate transaction involving land acquisition, licenses, codes and permits development, construction, sale, and financing. Consideration of new forms and concepts of ownership, transportation programs as a part of land development planning, the migration of people and industry as a planning and control factor, and private and public "new town" develop ments. (Examination) (Fall—day; summer 1972)

502 **Water Resources Law** (3) Reitze, Cunningham

Introductory survey course in the law relating to water resources. History and development of water rights systems in the United States using a com

parative analysis of Eastern and Western water law doctrines, the trends toward their modification, and study of the increasing influence of federal laws and projects. Consideration of private and public rights to both consumptive and nonconsumptive uses; analysis of pollution and other water quality problems and their interrelationships with the total demand for water and other natural resources. Identification of federal-state-local relationships, conflicts, and institutions; consideration of river-basin management and interbasin transfers; description of proposed creation of new sources. (Examination) (Fall—evening)

503 **Natural Resources Law and Policy** (2) Kratchman

Study of key legal doctrines and their development in the law of water, mining, and oil. Systematic analysis of natural resource problems such as government and private interactions, multiple use and priorities of resources, and security of property rights. Examination of alternatives in resource policy development, and impact on private and public actions. (Research Paper) (Spring—evening)

505 **Intergovernmental Relations I** (2) Nash

Study of federalism, emphasizing current techniques for achieving cooperation and coordination between federal, state, and local governments. Detailed consideration of devices used, including interstate compacts, grants-in-aid, and exercise of regulatory powers. (Writing Assignments) (Fall—day)

506 **Intergovernmental Relations II** (2) Nash

Advanced seminar on multi-government activities and current topics on intergovernmental relations. (Research Paper) (Spring—day)

508 **Environmental Litigation** (2) B. Cohen

Special problems of environmental lawsuits. Topics include pleadings, procedural problems, selection of the proper court, problems of proof, remedies, selection of parties, discovery techniques and trial preparation, and the use of expert witnesses and scientific evidence. (Examination) (Spring—evening)

509 **Clinical Studies in Environmental Law** (2 or 3 or 4) Reitze

The student works on a project in the environmental law field under the supervision of both the faculty director of the program and a lawyer practicing environmental law. The project may involve working with a government agency, a congressional committee, a private practitioner, or a nonprofit public-interest environmental organization. The aim of the course is to have the student produce a serious piece of professional work under close supervision. Admission to this course requires second-semester second-year, third-year, or graduate standing and permission of the Director of the Environmental Law Program. Students who have mastered the fundamentals of environmental law are selected for this course. Normally this will require completion of at least Law 380. In addition, consideration will be based on the other environmentally related courses taken including those in Natural Resources Law and in Law, Science, and Technology, as well as work experience and other demonstrated interest in environmental law. Students may repeat this course for a maximum of 8 semester hours of credit. Students registering for Law 509 are reminded that a maximum of 10 semester hours of credit may be earned in these courses—Law 346, 399, 459, 509, and 579. The grade *CR* (credit) or *NC* (no credit) is given for this course. (Fall and spring—day)

Master of Laws candidates in the area of Natural Resources Law and Enviro mental Law who have not taken the following courses or their equivalent part of a Juris Doctor or Bachelor of Laws program should include them their Master's program.

380 *Environmental Law I*
381 *Environmental Law II*

OTHER RELATED COURSES

349 *Local Government Law*
403 *Public Economic Policy and the Law*
431 *Government Procurement Law*
491 *Science Policy Formulation*
492 *Seminar: Science and the Legal Process*
495 *Legal Protection against Technological Hazards*
532 *International Law of the Sea*
560 *Taxation—State and Local*
571 *Land Development Planning*
590 *Population Control and the Law*
591 *Legislative Drafting*

PATENT AND TRADE REGULATION LAW

Faculty Advisers: L.J. Harris, I. Kayton, G.E. Weston

521 **International and Comparative Patent Law** (2) Federico

Origin of patent laws. Patent systems of major countries—United Kingdom, France, Germany, USSR, and others. Comparative topical survey, kinds of patents, inventors and applicants, subject matter, novelty, administrative procedures, oppositions, revocation, renewal fees, compulsory licensing infringement, etc. International Convention for the Protection of Industrial Property: origin, membership, organization, substantive provisions. Treaties in the making, Common Market patent system, Nordic Patent, Patent Cooperation Treaty, Council of Europe activities. Prerequisite: Law 359 or the equivalent in experience. (Take-home Examination)

522 **Patent and Know-how Licensing** (2) Finnegan

The business and legal criteria necessary to implement and maintain successful licensing programs; emphasis on the strategy and techniques that permit a proprietor of intellectual property to effectively exploit his status as the owner of a unique form of property. Subject areas covered are business objectives in licensing; legal outline of licensing situations; rights and duties of license parties; factors in selecting which inventions to license—financial, legal, and commercial; finding and selecting the right licensees; determining and negotiating the terms and clauses of the contract; administering and enforcing the license; antitrust and misuse constraints on the business and law of licensing; tax factors affecting the patent and know-how contract; special problems in trade secret, know-how, and show-how contracts; international licensing. Prerequisite: Law 359. (Choice of Paper or Examination) (Spring—evening)

523 **Court Review of Patent Office Decisions** (2) Dunner

Procedure and procedural law involved in appealing to the U.S. Court of

Customs and Patent Appeals and the U.S. District Courts from administrative decisions in the U.S. Patent Office. Designed to provide an exhaustive step-by-step procedural progression through *ex parte* and *inter partes* patent and trademark appeals. Emphasis on the forms used in the many motions and proceedings before the U.S. Court of Customs and Patent Appeals and the District Courts required to perfect an appeal. Attendance at and critique of actual court proceedings. Introductory material includes administrative appeals before the U.S. Patent Office Board of Appeals. Prerequisite: Law 359 and 362, or former Law 360; or the equivalent in experience. (Examination) (Fall—evening)

524 **Chemical Patent Practice** (2) White

Seminar covering patent application preparation, prosecution, appeals, and licensing which are peculiar to chemical patent practice. Prerequisite: Law 359; 362; or comparable experience in the practice of patent law. (Examination) (1972–73 and alternate years; fall—evening)

525 **Copyright Law** (2) Cary

Historical background; formalities and essentials in securing a copyright; subject matter of copyright; remedies; international aspects of copyright under Berne Union, Universal Copyright Convention, Inter-American Convention; copyright licensing and performing rights societies. (Examination) (Spring—evening)

526 **U.S. and International Trademark Practice** (2) Offner

Registerability and enforcibility of trademarks and tradenames in the United States and in several foreign countries. Procedural and substantive law necessary to advise as to what names and marks are registerable in the United States and the detailed procedure to be followed before the U.S. Patent Office in obtaining federal registration. A comparative law approach with respect to procedures for registration in foreign countries. Legal considerations with respect to licensing trademarks and tradenames internationally. Prerequisite: Law 329. (Examination) (Fall—evening)

527 **Advanced Topics in Patent Law** (2) Harris

Multidisciplinary consideration in depth of current industrial-intellectual property problems; licensing and protection of industrial property; uses and abuses of patents; governmental regulation; protection and transactions abroad; international treaties and arrangements; role of patents, trademarks, and trade secrets in business; economic and social functions of patents, trademarks, and copyrights. Students are exposed to pertinent source materials, professional research methods and techniques. Opportunity for oral presentation and discussion of term papers prior to submission is provided to encourage instructional dialogue among students and the investigation and analysis of issues. Prerequisite: Law 359 and 362, or former Law 360; or the equivalent in experience. (Research Paper) (Spring—evening)

529 **Research in Patent, Trademark, and Copyright Law** (2) Harris

Prerequisite: Law 417, 527, and related courses; and a *B* average. Request in writing, with proposed outline of topic of research, must be submitted to the Dean at least one month prior to registration day. Work must be completed within the semester and paper submitted not later than last day of classes. Graduate students may repeat this course once for credit with the approval of the Dean. (Research Paper) (Fall and spring)

Master of Laws candidates in the area of Patent and Trade Regulation Law wh
have not taken the following courses or their equivalent as part of a Juris Do
tor or Bachelor of Laws program should include them in their Master's program

329 *Unfair Trade Practices*
330 *Federal Antitrust Laws*
359 *Patent Law*
362 *Patent Office Practice*

OTHER RELATED COURSES

412 *Food and Drug Law*
417 *Seminar: Trade Regulation*
427 *Legal Aspects of International Business Transactions*
431 *Government Procurement Law*
491 *Science Policy Formulation*
492 *Seminar: Science and the Legal Process*
493 *Intergovernmental Aspects of Technological Change*
541 *Seminar: European Common Market*
562 *Income Taxation of Foreign Business and Investment*

INTERNATIONAL LAW AND COMPARATIVE LAW

Faculty Advisers: International Law—W.T. Mallison; Comparative Law—
J.M. Albert

531 International Law of Air and Space (2) Dembl

Study of the development of international law relating to the use of a
space and outer space; analysis of air and space treaties in force; the role
of various intergovernmental and nongovernmental international organiza
tions; consideration of special problems such as liability resulting from
space activities, space technology and arms control, and pollution and
contamination of outer space; earth resources, sensing, etc. (Research
Paper) (Fall—evening)

532 International Law of the Sea (2) Mus

International and domestic law affecting the allocation of authority over
ocean space. Problems concerning internal waters, territorial seas, the
high seas, contiguous zones, and the continental shelf; the impact of ad
vances in ocean science technology on ocean resource law; freedom of the
sea, maritime safety, and related subjects. (Research Paper) (Spring
—evening)

533 Legal Regulation of International Coercion (2) Mallison

Process of legal decision during war and at times when expectations of
violence are high—contemporary international law of war and coercive
measures short of war, such as limited naval blockade; legal aspects of
modern methods of coercion—economic, political, psychological, and
military; limited war and modes of preventing "escalation" to total war;
regulation of hostilities including protection of war victims, civilian per
sons, and prisoners of war; war crimes and punishment; problems con
cerning weapons of mass destruction; and problems of transforming co
ercion situations to minimum order ones. (Research Paper) (Fall—
day)

535 **Negotiation: Concepts and Techniques** (2) Ramundo

Role of the lawyer and policy maker (client) in private, intragovernmental, and international negotiations; negotiations in private practice and governmental operations; achievement of consensus among contentious parties; negotiating techniques, including effective use of the "fallback"; gaming exercises in the actual conducting of negotiations, with practical work in the preparation of claim letters, agency and national positions, and negotiating instructions. (Writing Assignments) (Spring—evening; summer 1972)

536 **Diplomatic and Consular Law and Practice** (1) Mitchell

Development of diplomatic and consular relations between nations; legal rights, privileges, functions, and immunities of diplomatic and consular personnel; extent of immunity from jurisdiction of foreign government missions and representatives; problems of taxation affecting foreign government missions and personnel. (Research Paper)

537 **The International Law of Human Rights** (2) del Russo

Theory of fundamental freedoms from its philosophical to its legal formulation in the American and French Revolutions, the individual, vis-a-vis, the State, human rights as rights against the national government, the emerging of the individual in the law of nations as a subject of rights and duties, the individual as subject of international concern, social and political forces stressing the need for international recognition and protection of human rights, the setting of human rights standards. The Universal Declaration and its influence over the law of nations, critical assessment of the work of the UN in the human rights field, regional approach to the international protection of human rights, analysis of the case law of the European Convention, human rights in the Inter-American system, state sovereignty and the international protection of human rights, a comparative approach to human rights' protection at the national level, due process and freedom of speech in light of different legal systems. (Research Paper) (Spring—day)

540 **Comparative Conflict of Laws and Transnational Legal Problems** (2) Delaume

Adjudicatory jurisdiction, recognition and enforcement of foreign judgments in England and the Common Market countries; choice of forum clauses; transnational commercial arbitration; the Convention on the Settlement of Investment Disputes between States and Nationals of Other States; sovereign immunity; international judicial assistance; proof of foreign law; transnational contracts and stipulations of applicable law. Prerequisite: Law 309. (Research Paper)

541 **Seminar: European Common Market** (2) Belman

Analysis of treaty establishing European Economic Community; institutions of EEC and of member states and the internal law of member states as they affect doing business in EEC; series of problems arising out of establishing and operating business with and within EEC. Background in international law and antitrust law desirable. (Problem Assignments) (Fall—evening)

542 **Seminar: International Technical and Economic Assistance** (2)

Technical and economic assistance activities of the United States, the United Nations, and specialized agencies; problems of law, policy, pro-

gram, and administration; development planning; public and private tran- actions and institutions involving technical or economic assistance. (Re- search Paper)

546 **Soviet Law** (2) Ramund

Concept of "socialist legality"; legal relationship of individual to state and other participants in Soviet society; role of Party in Soviet legal system; Soviet philosophy of law; state (constitutional) law: Soviet federalism, governmental apparatus, rights and obligations of citizenship; criminal law; property law; labor law; selected topics in civil law and procedure; international law. (Choice of Paper or Examination) (Fall—evening)

547 **Chinese Law** (2) Ha

Emphasis on the legal system of Communist China; analysis of the con- stitutional law of the People's Republic of China, including general prin- ciples, state structure, and rights and duties of citizens; a brief survey of the administration of justice—courts, procuratorates, and lawyers; mar- riage law; land law; counterrevolutionary act and other criminal statutes; principles of civil law; Communist Chinese concept of international law. (Research Paper)

548 **Law of the Near East** (2) Liebesn

Law of the Arab countries, Turkey, and Iran, including basic principles of Islamic law, analysis of the present day codes, and investigation of the Western influences on laws of these countries. (Examination) (Spring —evening)

Master of Laws candidates in the area of Public International and Comparative Law who have not taken the following courses or their equivalent as part of a Juris Doctor or Bachelor of Laws program should include them in their Mas- ter's program.

302 *Admiralty*
303 *International Law and World Order*
307 *Comparative Law*
309 *Conflict of Laws*
391 *United Nations Law and World Order*

OTHER RELATED COURSES

427 *Legal Aspects of International Business Transactions*
494 *Use and Control of Atomic Energy and Space Technology*
505 *Intergovernmental Relations I*
506 *Intergovernmental Relations II*
521 *International and Comparative Patent Law*
562 *Income Taxation of Foreign Business and Investment*

TAXATION

Faculty Advisers: J.R. Hambrick, D.B. Weaver

551 **Taxation—Partnerships and Subchapter S** (2) Weaver

Income tax problems of partnerships and tax-option corporations (Sub- chapters K and S of the Internal Revenue Code of 1954). Prerequisite: Law 336. (Examination) (Spring—evening)

553 **Seminar: Estate Planning** (2) Weaver, Speiller, Horowitz

Study of the effective disposition of wealth by inter vivos gift and testamentary transfer; emphasis on income, estate, and gift tax considerations; use of the trust form in the transfer of wealth; use of insurance and jointly held property as part of the estate plan; planning for the continuation or disposition of the client's business interests. Preparation of an estate plan, with supporting documents is the major project for the course. Prerequisite: Law 338. (Problem Assignments) (Fall and spring—evening; summer 1972)

555 **Taxation—Special Corporation Problems** (2)

Detailed study of the principal federal tax benefits of the corporate form of doing business. Consideration of problems involved in the tax planning of the corporate structure and corporate operation, including the tax definition of a corporation, the special deductions available to corporate payers, the compensation of the corporate executive and employee, the debt-equity question, the accumulated earnings tax, the personal holding company tax, multiple corporations, and consolidated returns. Survey of the types of corporations receiving special treatment under the Internal Revenue Code, such as financial institutions, real estate investment trusts, regulated investment companies, cooperatives, and small business corporations. (Research Paper)

557 **Taxation—Exempt Organizations** (2) Treusch

Tax-exempt organizations: policy and practice of preferred tax treatment for selected organizations and gifts to them. Statutes, regulations, and IRS practice; legislative origins, judicial interpretations, and policy consideration. Tests of qualification, disqualification, and limited tax preference. Mechanics of securing and retaining exemption; qualified exemption; unrelated business income; private inurement, political activity. Denial or loss of exemption. Return and reporting requirements. Comparative tax treatment of nonexempt and nonprofit organizations. Special sanctions with respect to private foundations, managers, and donors for improper, excessive, or prohibited activities. Prerequisite: Law 336 (Examination) (Fall—evening)

558 **Taxation—Real Estate and Income** (2) Tucker

The effect of income taxes on the real estate market and real estate transactions: sales and exchange of real estate interests; various entities for the ownership and development of real estate; the impact of taxes on the landlord and tenant; the impact of taxes on the mortgagor and mortgagee, including the choice of financing techniques, such as the sale-leaseback; depreciation, amortization, and obsolescence; basis and basis adjustments; and casualties and other involuntary conversions. (Examination) (Fall—evening)

559 **Taxation—Oil and Gas** (2) Hambrick

Application of federal income tax law to producing segment of oil and gas industry. Classification of interests; treatment of exploration and development expenditures. Depletion allowance and concept of "economic interests." Sales and "ABC" transactions. Organization problems. Prerequisite: Law 336. (Examination) (Spring—evening)

560 **Taxation—State and Local** (2) Field

Taxation by state and local governments; problems of real and personal property taxation, sales and use taxes, business and personal income

taxes. Limitations on taxation of interstate commerce. Congr
problems. Prerequisite: Law 336. (Choice of Paper or Exami
(Spring—evening)

562 **Income Taxation of Foreign Business and Investment** (2) Ha

The provisions and policies of the federal income tax law applic
foreign income, including considerations affecting the choice of m
of engaging in foreign business and investment, treatment of co
foreign corporations, allocation of income in foreign commerce,
for foreign taxes, principles and trends of U.S. tax treaties. (Exami

564 **Seminar: Special Problems of Tax Policy** (2) E

Intensive study of selected aspects of the tax structure with prima
tention given to the federal income tax. Problem areas are reviewe
marily from the standpoint of tax policy, including legal, economi
cial, and practical considerations. Alternative solutions, including
rent legislative proposals, are examined. Prerequisite: Law 336.
(Research Paper) (Fall—evening)

567 **Seminar: Tax Practice and Procedure** (2) Kapp, T

Review of the major areas of tax practice, including organization o
Internal Revenue Service, legislation, administrative regulations, tax
ning, tax rulings, tax audit, settlement procedures, claims for refund,
collection processes, criminal tax practice, and ethical problems in
practice. Preparation of various documents is required. Prerequi
Law 336. (Problem Assignments) (Fall and spring—evening)

568 **Seminar: Federal Tax Litigation** (2) Treu

Choice of forum. Conduct of civil tax cases: trial practice in the
Court, the District Courts, and the Court of Claims; appeal practice in
Courts of Appeals and on certiorari to the Supreme Court; analysis
drafting of pleadings, motions, and briefs; oral argument; settlements
stipulations of fact. Comparative responsibilities and procedures of I
and of the Department of Justice for litigation control. Prerequisite: L
567. (Writing Assignments) (Spring—evening)

Master of Laws candidates in the area of Taxation who have not taken the fo
lowing courses or their equivalent as part of a Juris Doctor or Bachelor
Laws program should include them in their Master's program.

336 *Taxation—Federal Income*
338 *Taxation—Federal Estate and Gift*
340 *Taxation—Federal Income, Corporations and Shareholders*
351 *Law and Accounting*

OTHER RELATED COURSES

403 *Public Economic Policy and the Law*
404 *Securities Regulation*
424 *Business Planning*
427 *Legal Aspects of International Business Transactions*

URBAN LEGAL STUDIES

Faculty Advisers: R.S. Kuhn, M. Pock, D.P. Rothschild

571 **Land Development Planning** (3) McGrath*
(Formerly Land Use Planning)
Selected problems in urban and regional planning: applications of zoning, urban renewal, and special programs available for the implementation of development plans. (Examination and Paper) (Spring—evening)

575 **Community Economic Development** (2) Leftwich, Stevenson
(Formerly Economic Development Planning for the Inner City)
A substantive study of the organizational, financial, and tax-planning aspects of nonprofit, cooperative, and small business organizations. Problems illustrating some of the legal considerations of a nonprofit organization and a small business. Consideration of the problems of economic development and current efforts to stimulate it. Prerequisite: Law 312, 336. (Problem Assignments) (Fall—evening; spring—day)

579 **Clinical Studies in Urban Law** (2 or 3) Staff
Service in the Community Legal Clinic under the supervision of the Director of the Clinic. The Clinic helps Washington, D.C., area agencies and community groups with the problems of the inner-city and Washington's black and Spanish-speaking residents. Students are assigned to specific projects, such as providing legal counsel to the Director of the Neighborhood Development Center in Anacostia; investigating job discrimination complaints, including working with volunteer attorneys suing for relief; assisting in the preparation and conduct of a class action to remedy alleged police misconduct in a nearby black community; analyzing pending legislation and preparing testimony for an organization of ex-convicts; and working with urban planning students in preparing proposals for construction of housing and community facilities on surplus federal lands in Southeast Washington. Students who perform 10 hours' service each week for the semester receive 2 semester hours of credit; students who perform 15 hours' service each week for the semester receive 3 semester hours of credit. May be repeated for credit not to exceed 6 semester hours. Students registering for Law 579 are reminded that a maximum of 10 semester hours of credit may be earned in these courses—Law 346, 399, 459, 509, and 579. Registration in the same semester for Law 346 and 579 not permitted. The grade of *CR* (credit) or *NC* (no credit) is given for this course. (Fall and spring)

Descriptions for the other courses in this area (listed below) appear elsewhere in "Advanced Courses."

451 **Federal Programs for Urban Poverty** (2)

458 **Housing the Poor** (2)

459 **Problems of the Consumer** (2)

461 **Social Welfare Legislation and Administration** (2)

501 **Land Development Law** (3)

505 **Intergovernmental Relations I** (2)

*Dean Charles McGrath, Jr., is Professor of Urban Planning and Chairman of the Department of Urban and Regional Planning in the School of Government and Business Administration.

506 **Intergovernmental Relations II** (2)

560 **Taxation—State and Local** (2)

Master of Laws candidates in the area of Urban Legal Studies who taken the following courses or their equivalent as part of a Juris Bachelor of Laws program should include them in their Master's prog

349 *Local Government Law*
445 *Labor Relations in State and Local Governments*
477 *The Police and the Community*

OTHER RELATED COURSES

460 *Current Problems in Civil Rights*
462 *Family Law of the Poor*
475 *Law and Criminology I: Search for the Causes of Criminal Beh*
476 *Law and Criminology II: Society's Responses to the Criminal O*
487 *Interdisciplinary Seminar on the Juvenile Court*
592 *Seminar: Constitutional Law*

OTHER ADVANCED COURSES

590 **Population Control and the Law** (2)

Consideration of the concept of an "optimum" population throu examination of existing statutes which encourage or discourage popu growth; relevant Supreme Court cases; international policies of a law nature leading to population stabilization; and proposed legisl (Research Paper)

591 **Legislative Drafting** (2) Zw

Advanced instruction and practice in legislative drafting; overview of islative process with emphasis on legislative drafting. Enrollment lim to 30 students. (Problem Assignments) (Spring—evening)

592 **Seminar: Constitutional Law** (2) Dixon, H. Gl

Group study of contemporary problems in constitutional law; process constitutional litigation; problems of effectuating constitutional guaranti (Research Paper) (Spring—day)

593 **Seminar: American Legal History** (2) D. Gre

From the outbreak of the Revolution at Lexington and Concord to th death of John Marshall. An examination of men, events, and movement significant in the unfolding of our laws and legal institutions in this format tive period of our national life, including a critical examination of th place of the lawyer in a revolutionary age. Comparison of the role of th lawyer during the politically and socially unsettled time of Marshall wit the role of the lawyer in today's troubled scene. Each member of the seminar presents the results of his research and thought either by an ora or by a written report. The grade of *CR* (credit) or *NC* (no credit) is given for this course. (Problem Assignments) (Fall and spring—day)

594 **Seminar: Privacy** (2) Park

Detailed study of civil interests in freedom from intrusion, with problems including government surveillance, private investigations, psychological

testing, state regulation of marital relations, and conduct restrictions of public institutions. Discussions based on a small number of cases, selections from the literature of psychology and psychoanalysis, legal readings, and student research memoranda and papers. Students should have a substantial academic background in at least one of the following areas: psychology, sociology, philosophy, or civil rights law. In addition to the research paper, weekly memoranda will be required. Enrollment limited to 24 students. (Research Paper) (Spring—day)

595 **Seminar: Supreme Court Practice** (2) Gressman

Study of the jurisdiction, practice, and procedure of the Supreme Court of the United States. Certiorari and appeal; the Court's Rules of Practice; how to prepare petitions and jurisdictional statements; the internal operation of the Supreme Court; other related aspects of Supreme Court practice, such as bail and stay applications, use of extraordinary writs, motions practice, oral argument, and briefing; *in forma pauperis* procedures. Students will prepare documents used in Supreme Court practice—petitions for certiorari, jurisdictional statements, and opposing briefs and arguments —using the actual conference list of cases pending before the Court. (Research Paper) (Spring—day)

596 **Seminar: Contracts** (2) Freedman

Advanced problems in contracts, such as the relationship of contract and tort (substantively, procedurally, and in measuring damages), Article II of the Uniform Commercial Code, product liability, commercial frustration, unconscionability, remedies, anticipatory breach, consumer's rights, and professional responsibility of the civil practitioner. Hours arranged at the convenience of the students. Admission by permission of instructor. (Research Paper) (Fall—day)

597 **Independent Studies** (arr.) Staff

Limited to teaching fellows. The proposed program of study must be submitted to a faculty member in writing and approved prior to the beginning of the semester. May not be elected for more than 12 semester hours of credit. (Fall and spring)

598 **Research in Public Law** (2) Staff

Registration limited to students with at least a *B* average who have had a seminar or comparable course in field of proposed research. Request in writing, with proposed outline of topic of research, must be submitted to the Dean at least one month prior to registration day. Work must be completed within the semester and paper submitted not later than last day of classes. Students may repeat this course once for credit with the approval of the Dean. (Research Paper) (Fall and spring)

599–600 **Thesis** (2–2)

Students must register for two successive semesters. (Fall and spring)

SPECIAL PROGRAMS IN RESEARCH AND INSTRUCTION

COMPUTERS-IN-LAW INSTITUTE

Director Irving Kayton

THE COMPUTERS-IN-LAW INSTITUTE is coping with the problems posed by the advent of computers in the practice and theory of law. Projects are underway for the purpose of advancing the state of knowledge and pedagogical techniques connected with the law-computer interface. Major areas of current activity and interest include legal protection of computer programs (programs are the instructions by means of which the user instructs the machine to perform his tasks); antitrust problems in the computer industry; computerized legal information retrieval systems; automatic composition of legal publications; systems studies oriented toward preserving the privacy of the individual in connection with large computerized data centers; computerization of land records and mechanization of routine court administration; and the application of computer techniques to a generalized reapportionment procedure. Other areas of interest include the impact of the computer on taxes and telecommunications. Current educational programs include the annual "Law of Software Conference" and the "Computers and Tax Conference."

ENVIRONMENTAL LAW PROGRAM

Director A.W. Reitze

The Environmental Law Program seeks to provide both academic and clinical experience in the environmental law field. The program is predicated on an exchange of information and experience between the academic community and the world of the practicing attorney. The result is a forum for presentation, discussion, and implementation of legal avenues to cope with the critical environmental issues of the present and future generations. These goals are achieved through courses, seminars, research projects, and clinical activities.

GOVERNMENT CONTRACTS PROGRAM

Director John Cibinic, Jr.
Assistant Director G.J. Ginsburg

A comprehensive government contracts program provides continuing instruction for industry and government personnel in this field and a program of courses leading to the Master of Laws degree in Government Procurement Law. The program includes (1) short seminars, (2) one-week courses in ad-

vanced problems in the field, (3) an annual institute treating a problem contemporary importance, (4) an annual conference in a major area, (5) c pilation of materials for use in current courses, (6) publication of a series monographs treating special problems in the field, and (7) special resea projects.

INSTITUTE OF LAW, PSYCHIATRY, AND CRIMINOLOGY

Director R.C. Allen
***Co-director* Leon Yochelson**

The Institute of Law, Psychiatry, and Criminology draws upon the insights a techniques of the behavioral sciences in areas of mutual concern to law and sister disciplines, with special emphasis in the fields of forensic psychiatry a criminology.

INTERNATIONAL LAW PROGRAM

Director W.T. Mallison

The objective of the International Law Program is to provide a better unde standing of how decisions in international law are actually made and the im provements which are needed in decision-making, sanctions processes, a accompanying legal institutions to promote the extension of the rule of la in the world community while considering the relationship between domes and international law. The Program also includes the international aspects business transactions and economic development. The objectives of the Pro gram are implemented through course work and seminars for both J.D. an Post-J.D. degree students and through research and writing in the field.

LAW, SCIENCE, AND TECHNOLOGY PROGRAM

Director H.P. Green

The Law, Science, and Technology Program deals with the reciprocal relation ships between law and science, providing courses, seminars, research studies, an publications to equip the legal profession to deal more effectively with th social, economic, political, and legal consequences of the nation's present mas sive commitment to scientific progress.

THE GEORGE WASHINGTON LAW ASSOCIATION

C.A. Dougherty, *Director of Law Alumni Relations*

HE GEORGE WASHINGTON LAW ASSOCIATION was founded in 1912 and has been ffiliated with the General Alumni Association since 1926. Its purposes as ated in the constitution are to promote high standards of legal education, to ep the alumni of the school in close touch with one another, especially with embers of their own classes, to gather and publish at intervals information as the whereabouts and activities of these alumni, and to further the interests the school.

Eligible members are those who have matriculated in the school or National niversity and have left in good standing, and any member or former member the faculty of the school. Active members are those eligible members who current contributors to the Law Annual Support Program of the University d life members of the George Washington Law Association.

The Association plans publication periodically of the Law Alumni Directory. w alumni are urged to keep the Alumni Office informed of their where- outs so that directory information can be kept up to date.

The Law Alumni Office is in Bacon Hall, 2000 H Street, N.W., Washington, .

FICERS FOR 1971–72

ident.—Philip F. Herrick, LL.B. 1933, LL.M. 1936; Washington, D.C.
t Vice President.—F. Elwood Davis, LL.B. 1943; Washington, D.C.
nd Vice President.—Marion Edwyn Harrison, LL.B. 1954, LL.M. 1959; ashington, D.C.
d Vice President.—Richard A. Ward, B.A. 1961, J.D.(W.H.) 1965; Wash- gton, D.C.
etary.—Betty Ann Thompson, B.A. 1946, LL.B. 1948; Arlington, Va.
surer.—Michael P. Bentzen, LL.B. 1964; Washington, D.C.
utive Committee:
seph D. Bulman, LL.B. 1931; Washington, D.C.
mes C. Cacheris, J.D.(W.H.) 1960; Alexandria, Va.
vin Capp, B.A. 1961, J.D.(W.H.) 1964; Fort Lauderdale, Fla.
ed H. Daly, J.D. 1966; Akron, Ohio
seph A. DePaul, LL.B. 1950; College Park, Md.
e Ann Fichtner, J.D. 1952; Dallas, Texas
ilip A. Gragan, B.A. 1953, J.D.(W.H.H.) 1959; Washington, D.C.
rold H. Greene, J.D.(W.H.) 1952; Washington, D.C.
l F. Hannah, J.D.(W.H.H.) 1933; Boston, Mass.
Timothy Hopkins, LL.B. 1963, Idaho Falls, Idaho

Joe L. Horne, J.D.(W.H.H.) 1951, LL.M. 1964; New Orleans, La.
James P. Hume, LL.B. 1926; Chicago, Ill.
Charles H. Landesman, LL.B. 1963; Kearny, N.J.
James R. Loftis III, J.D.(W.H.) 1968; Washington, D.C.
Charles A. Marlow, Jr., B.A. 1953, J.D. 1959; Washington, D.C.
Robert C. McCandless, B.A. 1961, Law (1936); Washington, D.C.
William H. McCullough, LL.B. 1950; Mt. Rainier, Md.
Milton E. Mermelstein, B.A. 1930, J.D. 1931; New York, N.Y.
Milan C. Miskovsky, LL.B. 1956; Washington, D.C.
Robert L. Oswald, LL.B. 1964; Washington, D.C.
Kenneth W. Parkinson, B.A. 1950, LL.B. 1952; Washington, D.C.
Thomas D. Phelps, J.D. 1963; Van Nuys, Calif.
Edward A. Potts, LL.B. 1952; Washington, D.C.
B.R. Pravel, J.D.(W.H.) 1951; Houston, Texas
Harry M. Reid, J.D. 1964; Las Vegas, Nev.
Brice W. Rhyne, J.D. 1951; Washington, D.C.
James Robertson, LL.B. 1965; Washington, D.C.
Robert D. Rolander, LL.B. 1953; Denver, Colo.
Walter F. Sheble, J.D. 1952, LL.M. 1953; Bethesda, Md.
John V. Skinner, J.D.(W.H.) 1962; Atlanta, Ga.
Thomas F. Smegal, J.D. 1961, San Francisco, Calif.
Alexander L. Stevas, B.A. 1949, LL.B. 1951; Washington, D.C.
Ethan B. Stroud, LL.M. 1956; Dallas, Texas
Gary L. Theurer, J.D. 1954; Washington, D.C.
Robert P. Visser, J.D.(W.H.) 1966; Washington, D.C.
Sterry R. Waterman, Law (1926); St. Johnsbury, Vt.
Lewis H. Weiss, J.D. 1930; St. Petersburg, Fla.
Glen A. Wilkinson, J.D.(W.H.) 1938; Washington, D.C.
Jerry D. Williams, J.D. 1962; Washington, D.C.
Leon L. Wolfstone, J.D.(W.H.) 1939; Seattle, Wash.
Oliver Gasch, *ex officio*, LL.B. 1932; Washington, D.C.



THE UNIVERSITY

STORY AND ORGANIZATION

E GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Colum-
n College in the District of Columbia. The name of the institution was
anged in 1873 to Columbian University and in 1904 to The George Wash-
ton University. The debt of the University to George Washington, whose
me it bears, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted
n the establishment of a National University in the Federal City. There he
ed that, while being instructed in the arts and sciences, students from all
s of the country would acquire the habits of good citizenship, throwing off
l prejudices and gaining at first hand a knowledge of the practice, as well as
theory, of republican government. To further the materialization of his
es, Washington left a bequest of fifty shares of The Potomac Company "to-
ls the endowment of a University to be established within the limits of the
rict of Columbia, under the auspices of the General Government, if that
rnment should incline to extend a fostering hand towards it." The Con-
never extended "a fostering hand." The Potomac Company passed out of
nce, and Washington's bequest became worthless.

lly conscious of Washington's hopes, but motivated primarily by a great
onary urge and the need for a learned clergy, a group of dedicated min-
and laymen sponsored a movement for the establishment of a college in
istrict of Columbia. Inspired largely by the zeal and energy of the Rever-
Luther Rice, they raised funds for the purchase of a site and petitioned
ress for a charter. After much delay and amendment, Congress granted a
er which was approved by President Monroe on February 9, 1821. To
ard the College's nonsectarian character it provided "that persons of
religious denomination shall be capable of being elected Trustees; nor
ny person, either as President, Professor, Tutor or pupil, be refused ad-
ce into said College, or denied any of the privileges, immunities, or ad-
es thereof, for or on account of his sentiments in matters of religion."

ing the entire time when the institution was known as Columbian College,
vities were centered on College Hill, a tract of forty-six and a half acres
n the present Fourteenth and Fifteenth Streets extending north from Flor-
venue to somewhat beyond Columbia Road. The Medical School was
downtown. For the better part of the Columbian University period, the
gs of the University were situated along H Street between Thirteenth and
th Streets.

During the last half century the University's present plant has been developed in that section of the old First Ward familiarly known as "Foggy Bottom" between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. The area is not without its reminders of historic interest to the University. President Monroe, who signed the Charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for fifty years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he had hoped to see established.

The University as it is now organized consists of Columbian College of Arts and Sciences (undergraduate); the Graduate School of Arts and Sciences; the professional schools, which include the National Law Center and the schools of Medicine, Engineering and Applied Science, Education, Government and Business Administration, Public and International Affairs; the College of General Studies; the Division of University Students; and the Summer Sessions.

The George Washington University is privately endowed and is governed by a self-perpetuating Board of Trustees of which the president is an ex officio member.

ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools. The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

LOCATION

The University is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the United States Information Agency, the Department of the Interior, the Department of State, the General Services Administration, the National Academy of Sciences, and the Kennedy Center for the Performing Arts.

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B.A. 1920, Johns Hopkins University; LL.B. 1923, S.J.D. 1926, Harvard University

Oswald Symister Colclough, *Professor Emeritus of Law; Dean of Faculties Emeritus; Director Emeritus of the Patent, Trademark, and Copyright Research Institute*
B.S. 1920, U.S. Naval Academy; LL.B. 1935, Sc.D. 1961, George Washington University; LL.D. 1946, Muhlenberg College; LL.D. 1958, Dickinson School of Law

George Bowdoin Craighill, *Professor Emeritus of Law*
B.A. 1903, University of the South; LL.B. 1906, Georgetown University

William Thomas Fryer, *Professor Emeritus of Law*
B.A. 1922, LL.B. 1924, George Washington University; J.D. 1925, Yale University

James Oliver Murdock, *Professor Emeritus of Law*
Ph.B. 1916, University of Chicago; LL.B. 1924, Harvard University

Alvin LeRoy Newmyer, *Professor Emeritus of Law*
LL.B. 1906, George Washington University

Charles Bernard Nutting, *Professor Emeritus of Law*
B.A. 1927, J.D. 1930, University of Iowa; LL.M. 1932, S.J.D. 1933, Harvard University; LL.D. 1957, University of Pittsburgh; Litt.D. 1957, Geneva College; L.H.D. 1957, Seton Hill College; LL.D. 1960, Dickinson School of Law

ACTIVE

†Jeffrey Marshall Albert, *Professor of Law*
B.A. 1956, Princeton University; LL.B. 1959, Harvard University; LL.M. 1962, New York University

Richard Chester Allen, *Professor of Law; Director of the Institute of Law, Psychiatry, and Criminology*
B.A. 1948, J.D. 1950, Washington University; LL.M. 1963, University of Michigan

Oscar Altshuler, *Professorial Lecturer in Law*
LL.B. 1951, George Washington University

Frederick Randolph Anderson, Jr., *Associate Professorial Lecturer in Law*
B.A. 1963, University of North Carolina at Chapel Hill; B.A. 1965, University of Oxford, England; LL.B. 1968, Harvard University

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B.S. in E.E. 1962, Massachusetts Institute of Technology; J.D. 1965, Columbia University

*Professors, Adjunct Professors, Associate Professors, Assistant Professors, and the Librarian of the Law Library constitute the Faculty of the National Law Center. The President of the University, the Vice President for Academic Affairs, the Registrar of the University, the Director of Admissions of the University, and the Director of Libraries of the University are ex officio members of the Faculty.

†On sabbatical leave fall semester 1972–73.

Eugene Norman Barkin, *Professorial Lecturer in Law*
B.A. 1940, University of Scranton; LL.B. 1943, Dickinson School of Law
Murray Joel Belman, *Professorial Lecturer in Law*
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B.A. 1941, University of Georgia; B.S. in L.S. 1947, Columbia University; J.D. 1961, George Washington University
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Sheldon Stanley Cohen, *Professorial Lecturer in Law*
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Marcus Cohn, *Professorial Lecturer in Law*
B.A. 1935, J.D. 1938, University of Chicago; LL.M. 1940, Harvard University
Thomas Francis Courtless, Jr., *Professor of Law and Sociology*
B.A. 1955, Pennsylvania State University; M.A. 1960, Ph.D. 1966, University of Maryland
Richard Best Cunningham, *Associate Professorial Lecturer in Law*
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Georges Rene Delaume, *Professorial Lecturer in Law*
Diplôme de Docteur en Droit 1947, University of Paris, France; M.Comp.L. 1953, George Washington University
Alessandra Luini del Russo, *Professorial Lecturer in Law*
Doctor Litterarum 1939, University of Milan, Italy; Dr.Jur. 1943, University of Pavia, Italy; M.Comp.L. 1949, George Washington University
Paul Gerald Dembling, *Professorial Lecturer in Law*
B.A. 1940, M.A. 1942, Rutgers University, New Brunswick; J.D. 1951, George Washington University
Robert Galloway Dixon, Jr., *Professor of Law*
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* On sabbatical leave fall semester 1972–73.

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* On sabbatical leave spring semester 1973.

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B.A. 1950, Reed College; J.D. 1956, Columbia University; LL.M. 1965, Harvard University

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B.A. 1964, Knox College; J.D. 1970, New York University

Eugene Harvey Rotberg, *Professorial Lecturer in Law*
B.S. 1951, Temple University; LL.B. 1954, University of Pennsylvania

Donald Phillip Rothschild, *Professor of Law*
B.A. 1950, University of Michigan; J.D. 1965, University of Toledo; LL.M. 1966, Harvard University

Joseph Michael Francis Ryan, Jr., *Professorial Lecturer in Law*
B.A. 1943, St. Joseph's College, Pennsylvania; LL.B. 1950, LL.M. 1952, Georgetown University; Judge, District of Columbia Court of General Sessions

Durvasula Srirama Sastri, *Lecturer in Law*
LL.B. 1957, Andhra University, India; LL.M. 1971, George Washington University

*Lewis Aaron Schiller, *Professor of Law*
B.A. 1950, LL.B. 1952, University of Texas at Austin; M.A. 1958, Tufts University

Teresa Moran Schwartz, *Associate Professor of Law*
B.A. 1965, Stanford University; J.D. 1971, George Washington University

†David Earl Seidelson, *Professor of Law*
B.A. 1951, LL.B. 1956, University of Pittsburgh

Stuart Evan Seigel, *Associate Professorial Lecturer in Law*
B.S. 1953, LL.B. 1957, New York University; LL.M. 1960, Georgetown University

David James Sharpe, *Professor of Law*
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George Walter Shelhorse, *Professorial Lecturer in Law*
J.D. 1951, George Washington University

Ronnie Shorenstein, *Lecturer in Law*
B.A. 1969, Syracuse University; J.D. 1972, George Washington University

John Silard, *Professorial Lecturer in Law*
B.A. 1949, LL.B. 1952, Columbia University

Eric Scott Sirulnik, *Visiting Associate Professor of Law; Director of the Community Legal Clinic*
B.A. 1965, Franklin and Marshall College; J.D. 1968, Boston University; LL.M. 1970, George Washington University

Dudley Graham Skinker, *Clerk of the Trial Practice Court*
LL.B. 1940, George Washington University

Daniel Lawrence Skoler, *Professorial Lecturer in Law*
LL.B. 1952, Harvard University

John William Snow, *Professorial Lecturer in Law*
B.A. 1962, University of Toledo; Ph.D. 1965, University of Virginia; J.D. 1967, George Washington University

William Marvin Speiller, *Professorial Lecturer in Law*
B.S. 1950, LL.B. 1952, Syracuse University; LL.M. 1953, Harvard University

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* On sabbatical leave fall semester 1972–73.
† On sabbatical leave spring semester 1973.

Nancy Elizabeth Stanley, *Assistant Professorial Lecturer in Law*
B.A. 1964, Knox College; J.D. 1970, George Washington University
Thomas Henry Stanton, *Associate Professorial Lecturer in Law*
B.A. 1965, University of California, Davis; M.A. 1967, Yale University; J.D. 1970, Ha
University
James Edward Starrs, *Professor of Law*
B.A., LL.B. 1958, St. John's University, New York; LL.M. 1959, New York University
Alexander Louis Stevas, *Professorial Lecturer in Law*
B.A. 1949, LL.B. 1951, George Washington University
Russell Bennett Stevenson, Jr., *Associate Professor of Law*
B.M.E. 1964, Cornell University; J.D. 1969, Harvard University
Theodore Tannenwald, Jr., *Professorial Lecturer in Law*
B.A. 1936, Brown University; LL.B. 1939, Harvard University
Robert Max Tobias, *Associate Professorial Lecturer in Law*
B.A. 1965, M.B.A. 1967, University of Michigan; J.D. 1969, George Washington University
Paul Ellsworth Treusch, *Professorial Lecturer in Law*
Ph.B. 1932, J.D. 1935, University of Chicago
Thomas Alfred Troyer, *Associate Professorial Lecturer in Law*
B.A. 1955, Harvard University; J.D. 1958, University of Michigan
Stefan Franklin Tucker, *Associate Professorial Lecturer in Law*
B.B.A. 1960, J.D. 1963, University of Michigan
David Benson Weaver, *Professor of Law*
B.A. 1943, Ohio Wesleyan University; J.D. 1948, Case Western Reserve University
Glen Earl Weston, *Professor of Law*
B.S. 1943, University of Maryland; J.D. 1948, George Washington University
John Leslie White, *Professorial Lecturer in Law*
B.A. 1948, M.S. 1949, Kalamazoo College; J.D. 1958, George Washington University
Judy Lyons Wolf, *Assistant Professorial Lecturer in Law*
B.A. 1964, Manhattanville College; J.D. 1970, Georgetown University
Murray Zweben, *Associate Professorial Lecturer in Law*
B.S. 1952, M.S. 1953, State University of New York at Albany; LL.B. 1959, George Washington University

Summary of Registration, Fall Semester 1971–72

	1st year	*2d year*	*3d year*	*4th year*	*Graduate*
Day	311	343	371	.....	52
Evening	130	115	85	71	335

Total: 1,813

APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety of the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property, or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate* and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 19, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs† of The George Washington University as soon after order is restored as is practicably possible.

* The University Senate has been renamed the Faculty Senate.
† The duties and functions of the Hearing Committee on Student Affairs are now performed by the Student-Faculty Committee on Appeals.

The following resolution, submitted by the Student Life Committee, wa proved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its tradit commitment to freedom of expression (a) by continuing to permit bus and government organizations which are recruiting employees to conduct activities at designated places on campus, and (b) by placing no obstacl students who may wish to protest the presence of such recruiters, provi however, that such protest shall be orderly and shall not impede or dis the recruiter in his activities.

The University affirms its place as a forum for the free exchange of id (a) by assuring that guests invited to speak on this campus at duly schedu meetings shall have the right to appear and to be heard, and (b) by sancti ing the freedom of students to express dissent from the views of the speak provided, however, that that expression of dissent be orderly and nonobstr tive.

The University distinguishes between orderly protest and resistance-by-o struction; it accepts the former as a legitimate expression of dissent while r jecting the latter as an abridgement of the freedoms of the individuals wh may be its object.

The following was approved by the University's Board of Trustees on Octob 19, 1968:

The George Washington University is opposed to discrimination based o race, color, or creed. Such discrimination may have appeared in campu organizations in the past. In the future, however, no organization can be rec ognized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent, considered ade quate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on October 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, research, and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the University,

may be punished for his conduct by dismissal from the University, or by some lesser disciplinary action, through procedures established within the University for the government of its members.

In order to insure due process, any student subject to dismissal or other disciplinary action on the grounds of violating any of the premises of this resolution shall have, at his discretion, the right of review of the action by the University Hearing Committee on Student Affairs.*



*The duties and functions of the Hearing Committee on Student Affairs are now performed by the Student-Faculty Committee on Appeals.

COLLEGES AND SCHOOLS—DEGREE PROGRAMS

COLUMBIAN COLLEGE OF ARTS AND SCIENCES: Associate in Arts (A.A.), Associate in Arts in General Studies (A.A. in Gen.Std.), Bachelor of Arts (B.A.), Bachelor of General Studies (B.Gen.Std.), Bachelor of Science (B.S.), Bachelor of Science in Environmental Health (B.S. in Env.Health), Bachelor of Science in Geodetic and Cartographic Science (B.S. in Geod. and Cart.Sc.), Bachelor of Science in Medical Technology (B.S. in Med.Tech.), and Bachelor of Science in Oceanography (B.S. in Ocea.)

GRADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master of Arts in Special Studies (M.A. in Sp.Std.), Master of Fine Arts (M.F.A.), Master of Music (Mus.M.), Master of Science (M.S.), Master of Science for Teachers (M.S. for Teachers), Master of Science in Forensic Science (M.S. in Forens.S), Master of Science in Special Studies (M.S. in Sp.Std.), and Doctor of Philosophy (Ph.D.)

SCHOOL OF MEDICINE: Doctor of Medicine (M.D.)

NATIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Master of Comparative Law (M.Comp.L.), Master of Comparative Law (American Practice) (M.Comp.L.(Am.Prac.)), and Doctor of Juridical Science (S.J.D.)

SCHOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil Engineering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) (B.S. (E.E.)), Bachelor of Science (Mechanical Engineering) (B.S. (M.E.)), Master of Engineering Administration (M.E.A.), Master of Science (M.S.), and Doctor of Science (D.Sc.)

SCHOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.), Bachelor of Science in Physical Education (B.S. in P.E.), Master of Arts in Education (M.A. in Ed.), Master of Arts in Teaching (M.A.T.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Business Administration (B.B.A.), Bachelor of Science in Administration (B.S. in Adm.), Master of Arts in Government (M.A. in Govt.), Master of Arts in Health Care Administration (M.A. in H.C.A.), Master of Business Administration (M.B.A.), Master of Public Administration (M.P.A.), Master of Science in Administration (M.S. in Adm.), Master of Urban and Regional Planning (M. of Urb. and Reg.Plan.), Post-Master's Graduate Certificate in Health Care Administration (Grad.Cert. in H.C.A.), Doctor of Business Administration (D.B.A.), and Doctor of Public Administration (D.P.A.)

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A.), Master of Arts (M.A.), and Master of Science in International Affairs (M.S. in I.A.)

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THE SCHOOL OF MEDICINE, 1825

THE NATIONAL LAW CENTER, 1865

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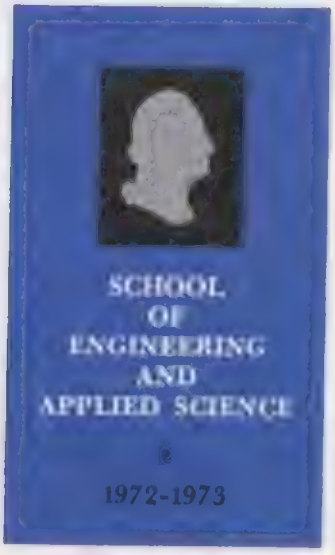
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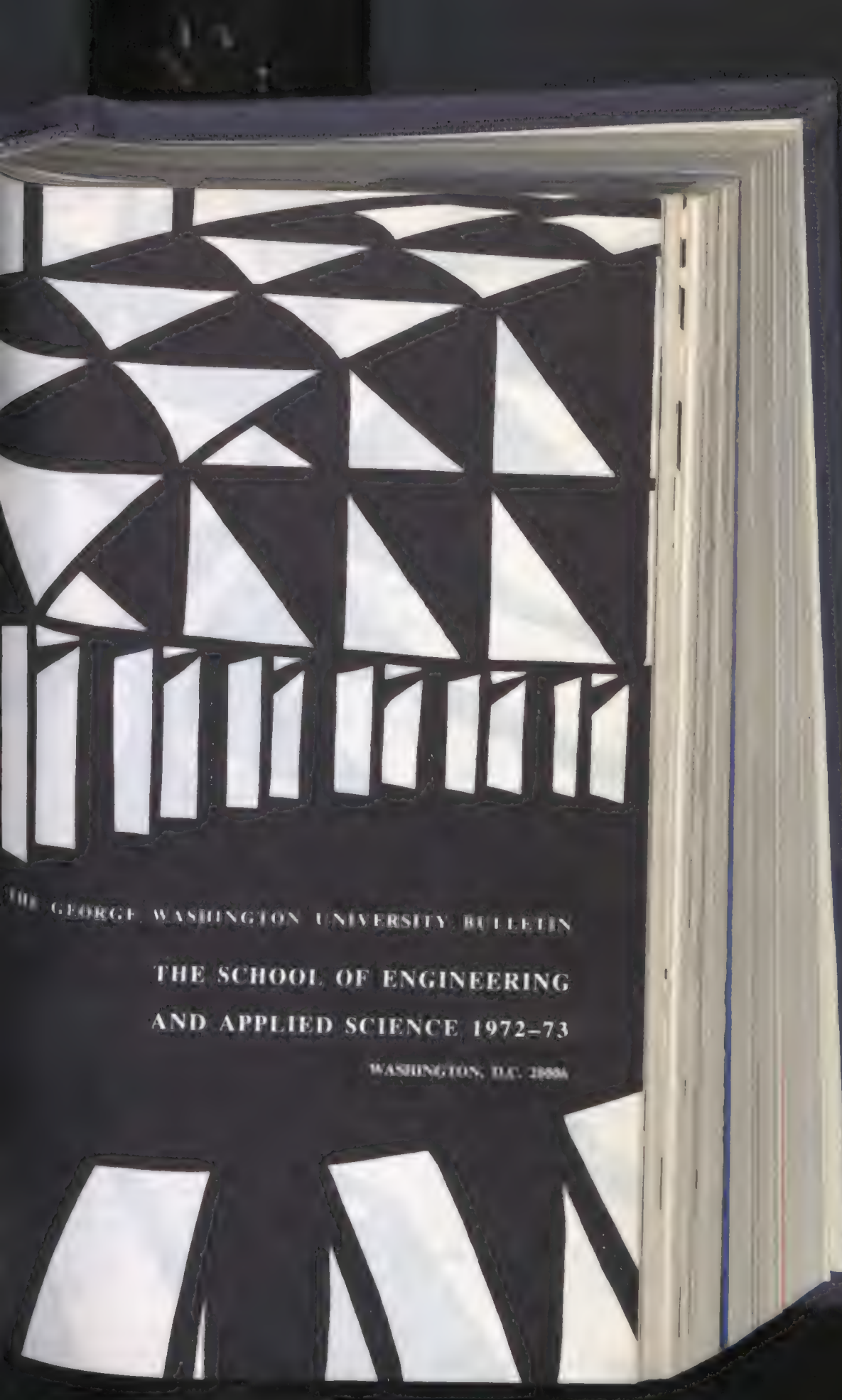


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THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE 1972–73

WASHINGTON, D.C. 20006



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1972 SUMMER SESSIONS

June 12	Registration for first 5-week session and 8-week cou *Monday*
June 13	First 5-week session and 8-week courses begin *Tues*
July 4	Holiday *Tuesday*
July 19	First 5-week session ends *Wednesday*
July 20	Registration for second 5-week session *Thursday*
July 21	Second 5-week session classes begin *Friday*
August 4	Eight-week courses end *Friday*
August 25	Second 5-week session ends *Friday*

1972 FALL SEMESTER

September 1	Orientation for students from foreign countries *Frida*
September 5	Placement tests for entering students *Tuesday*
September 5–6	Advising for all students *Tuesday–Wednesday*
September 7–9	Registration—Tompkins Hall of Engineering *Thursd Saturday*
	Application for February graduation due as part of re istration
September 11	Classes begin *Monday*
November 21	D.Sc. dissertations of February candidates due *Tues*
November 22	Thanksgiving recess begins after last class *Wednesday*
November 27	Classes resume *Monday*
December 4	Master's theses of February candidates due *Monday*
December 7	Last day of fall-semester classes *Thursday*
December 13–22	Examination period *Wednesday–Friday*

1973 SPRING SEMESTER

January 8	Placement tests and waiver examinations *Monday*
January 8–9	Advising for all students—*Monday–Tuesday*
January 11–13	Registration—Tompkins Hall of Engineering *Thursday Saturday*
	Application for May graduation due as part of regist tion
January 15	Spring-semester classes begin *Monday*
January 20	Inauguration Day (holiday) *Saturday*
February 19	Winter Convocation (holiday) *Monday*
March 10	Spring recess begins after last class *Saturday*
March 19	Classes resume *Monday*
March 20	D.Sc. dissertations of May candidates due *Tuesday*
April 6	Master's theses of May candidates due *Friday*
April 20	Last day of spring-semester classes *Friday*
April 26–May 5	Examination period *Thursday–Saturday*
May 6	Commencement *Sunday*

* This calendar is subject to change.

1972

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ALL PROSPECTIVE STUDENTS:

This catalogue describes the programs and requirements for undergraduate graduate study in the School of Engineering and Applied Science. It also ludes descriptions of courses; a listing of the faculty and staff; and informa- on fees, financial regulations and aid, and student services and activities. ormation is also included on the Cooperative Education Program, which vides the undergraduate engineering student with the opportunity to obtain enduring foundation in engineering education. The program combines aca- learning with practical, first-hand experience in the student's chosen of engineering. The student's earnings will help him pay for a major part he cost of his education.

The School of Engineering and Applied Science is a professional school in niversity comprised of eight degree-granting schools and colleges. The ironment of the Nation's Capital is very favorable for the intellectual and ural development of the student. The metropolitan Washington area con- the second largest concentration of research and development in the ited States, and the engineering component of this activity is similarly ensive.

The School of Engineering and Applied Science has been in continuous sion since 1884, and offers programs of study leading to Bachelor's, ter's, and Doctor's degrees. Its prime objective is to educate the student that he will have the precious asset of a well-trained mind which may be plied to the attainment of our many national objectives. In these changing es, it is necessary to search for quality. Students and faculty are required perform a certain amount of soul-searching. All should have the oppor- ity of assisting in the planning and implementation of educational programs. amination is being made periodically of the School's objectives and how relate to those established by the American Society for Engineering ucation. Emphasis includes such items as the student's basic and advanced els of education and his role in present and future society.

The atmosphere of the School is one of serious-minded effort toward mature velopment. Being a small school, it recognizes the individual as the single t important element in the educational process. The student body, under- duate and graduate, has a primary interest in design, research, development, management in both scientific and engineering activities. Many alumni of School are successfully engaged in all fields of engineering—in science, nagement, government, and education.

The philosophy of the School, which might be summarized as "education creativity, not conformity," has through the years reflected the many subtle profound changes in the engineering profession.

The faculty of the School and I look forward to providing a closer and re fruitful relationship with you. If you need additional information, please not hesitate to call upon the Department Chairmen or me.

HAROLD LIEBOWITZ
Dean
School of Engineering and
Applied Science



THE STUDY OF ENGINEERING

THE MEANING OF ENGINEERING AND APPLIED SCIENCE

ENGINEERING IS A BROAD PROFESSION. Its responsibilities and activities extend into every aspect of industry and research, and into many fields of commerce and the arts. Engineers have faced and continue to face problems in the production and distribution of all types of manufactured products, including the design of mechanical, electrical, and chemical processes, of equipment, and of plants in which such products are made; in the design and construction of an infinite variety of structures such as bridges, tunnels, harbors, and dams; in aircraft design and construction, including complicated electronic equipment for control, guidance, and communication; in the operation of transportation systems; in the wide spectrum of activities existing in the automotive industry; in the missile and space programs; in the generation and transmission of power; in the modern phases of communication; in the control of traffic; in city planning; in public health and sanitation as it affects the environment; and in ventilation and refrigeration. This list of applications is far from exhaustive; it does indicate, however, that engineering is a broad profession in which there are many specialists.

THE RELATIONSHIP OF ENGINEERING AND SCIENCE

In any discussion of "engineering and applied science," it is profitable to emphasize the distinction between engineering and science. The President's Scientific Advisory Committee points out that the engineer and scientist each play an important role on a team. "The scientist is one who seeks to extend the boundaries of knowledge in his chosen field. The engineer has the task of combining the knowledge of science with his knowledge and awareness of the needs and limitations of human beings and of a human society to develop and create things for human use. . . . While scientists have uncovered the basic knowledge, it is the engineers who have created the tangible tools, materials, and products that have revolutionized our daily lives, our community living, and our national defense."

The work of engineers is a focal point at which scientific knowledge, the use of such knowledge as a service to society, financial material, human resources, and society's needs are interrelated. The engineer is concerned, therefore, with the means for operating a dynamic society. He must consider not only whether the knowledge that exists will enable him to create a workable product, but also how the product can be built, who will use it, and how such use will affect the environment in which it will operate.

THE PROFESSIONAL ENGINEER

Engineers are concerned with the quality and preservation of human life. Engineer, as the term is used in this catalogue and as it is commonly understood in our society, refers to the person who makes use of the advances of science and technology in an economically feasible manner for the benefit of society. This process is complex and challenging. Although the content of engineering curricula is certainly scientific, the engineer has not lost his sense of purpose in serving as an intellectual agent in the practical world. This responsibility of the engineer arises from the breadth of the implications of engineering for the whole of society as well as from the depth of the requirements for competence. Technology has radically rearranged human life in our time. There are many who believe that, although the threshold of space has been crossed, the union of medical and engineering practice has been achieved, and breakthroughs have been made in other areas, this impact of engineering on modern life is just a modest preview of the engineering of tomorrow.

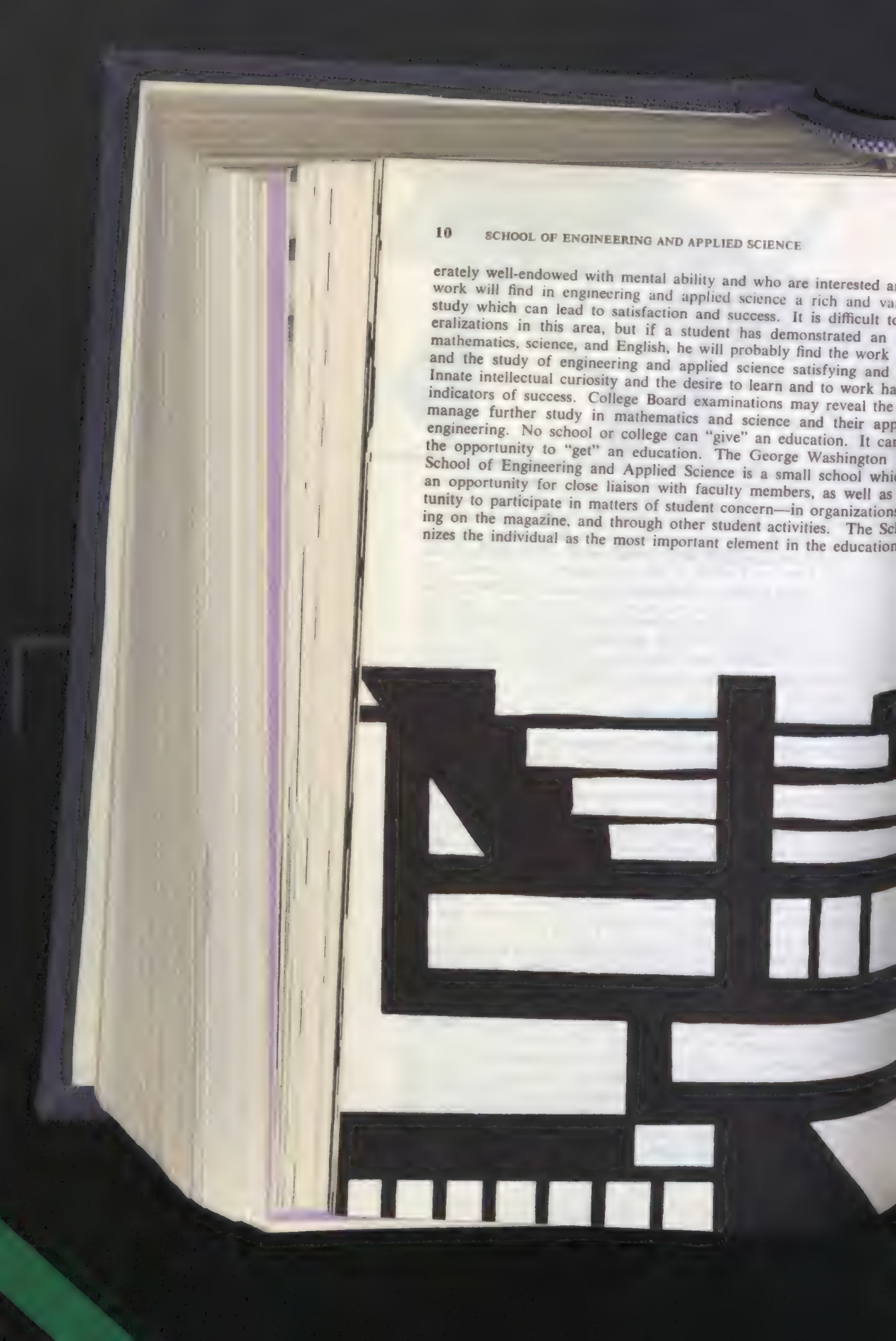
ENGINEERING EDUCATION AND THE STUDENT

Rapidly changing and advancing engineering activity requires an education for the future based on fundamental principles of science useful in applications to a dynamic, advanced society. In the fields of engineering and applied science there is no substitute for demonstrated ability and competence to solve the problems faced. Without question, achievement in particular courses of study is important. Equally important, however, is the ability to analyze and interpret all the aspects of a problem, to formulate solutions, and to evaluate those solutions in the light of all available information. The attainment of this objective is the basis for undergraduate education. The undergraduate program of the School of Engineering and Applied Science is subjected to periodic evaluation and appraisal by the faculty.

The curricula of the School of Engineering and Applied Science are founded on one basic principle—to assist the student in preparing for a career in engineering and applied science. This philosophy requires that the student master the principles on which future practice will be based and that he receive an education centered on that meaningful junction between theory and practice that throughout his professional life he can follow the many interests and opportunities that may develop.

It should not be assumed, however, that only the intellectual elite should consider the study of engineering and applied science. Engineering, like medicine, law, education, science, history, government, and other disciplines, requires scholars. But in any of these areas, even though the prospective student has not achieved high scholastic standing, if he is genuinely interested in the subject, he can probably find a place for himself. Those who are mod-

erately well-endowed with mental ability and who are interested a
work will find in engineering and applied science a rich and va
study which can lead to satisfaction and success. It is difficult t
eralizations in this area, but if a student has demonstrated an
mathematics, science, and English, he will probably find the work
and the study of engineering and applied science satisfying and
Innate intellectual curiosity and the desire to learn and to work ha
indicators of success. College Board examinations may reveal the
manage further study in mathematics and science and their app
engineering. No school or college can "give" an education. It ca
the opportunity to "get" an education. The George Washington
School of Engineering and Applied Science is a small school whi
an opportunity for close liaison with faculty members, as well as
tunity to participate in matters of student concern—in organization
ing on the magazine, and through other student activities. The Sc
nizes the individual as the most important element in the educatio



THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE

HISTORY

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE was organized October 1, 1884, as the Corcoran Scientific School of Columbian University and was situated in the University Building then at 15th and H Streets, N.W. The School was named in honor of William W. Corcoran, Trustee and President of the Corporation from 1869 to 1888. Day and evening courses were offered in Literature, Science, and Technology and led to the degrees of Bachelor of Science, Civil Engineer, Mechanical Engineer, and Mining Engineer. The School was among the first to accept women for degree candidacy in engineering.

In 1903 the Corcoran Scientific School, the School of Graduate Studies, and the Columbian College were merged into a single Department of Arts and Sciences. Engineering degrees were made graduate.

Administrative changes led to The Washington College of Engineering being initiated in 1905 as one of the several semi-independent undergraduate colleges of the University, each with its own Board of Trustees. The College provided instruction leading to undergraduate degrees in engineering and architecture.

In 1909 the name of the College was changed to the College of Engineering and Mechanic Arts, and the curricula were revised to give the student a thorough understanding of the theory underlying engineering practice. Emphasis was placed on the development of a knowledge of scientific principles upon which the student could build and by which he might solve new problems as they are met in practice.

The name of the School was changed again in 1914 to the College of Engineering and later to the School of Engineering. Architecture was dropped from the curriculum, and degrees were limited to the field of engineering. However, the primary emphasis upon principles rather than technology which had characterized the School since 1903 was continued and has remained to this day as one of the important distinguishing features of the School.

In 1962 the name of the School became the School of Engineering and Applied Science.

ACADEMIC STATUS

The George Washington University is accredited by its regional ac
agency, the Middle States Association of Colleges and Secondary Scho

The University is on the approved list of the American Association
versity Women and is a member of the College Entrance Examinatio

The curricula in Civil Engineering, Electrical Engineering, and Me
Engineering are accredited by the Engineers' Council for Professional
ment.

Undergraduate Study

THE UNDERGRADUATE PROGRAM is intended to provide a solid foundatio
basic principles, concepts, and techniques underlying engineering and
science, on which the individual may build technical competence in a
of areas as his professional career develops. It is preparation for a c
engineering or applied science, as it exists today and as it may develo
future.

Undergraduate study is the formal beginning of a life-long continui
gram of education. The School provides an environment that encoura
fosters the attitudes and disciplines essential to professional growth. Th
uate, when he receives his Bachelor's degree, is prepared for productiv
in his chosen field; he is also prepared for further development and p
both formal and informal. The undergraduate curricula include courses
humanities and social sciences to the extent necessary to develop a rea
understanding and appreciation of these areas of knowledge.

Admission to the engineering program indicates that the student po
at least minimum preparation and the probable capacity to meet the ac
demands of this School. Since the School cannot predict either the st
response to the demands made on him or the program he should follo
his most effective development, the undergraduate program has been de
to offer a variety of experiences through which the student may find h
best path to maturity and growth in educational development.

The School is a place for learning; for experiencing adventures of the
and of the hands; for the formulation, exchange, and exploration of ideas
ing his undergraduate years the student is led to strengthen his skills in a
and his talent for creative activity, through liberal use of project-type l
tory work. Independent thought and original ideas receive higher evalu
in the appraisal of student achievements, than the rote recital of inform

To provide the undergraduate engineering student with the opportun
obtain an enduring foundation in engineering education by combining aca
learning with relevant, real-world employment which provides practical
hand experience in his chosen field of engineering, the School of Engine
and Applied Science has a Cooperative Education Program in which arr
ments have been made with leading industrial and governmental organiza
for student employment at prevailing salary rates. Every effort is made to
the student in positions of employment that provide the best possible engi
ing experience consistent with his career plans. These work periods provid
student with income that may enable him to finance the major portion o

tuition and other expenses. Entering freshmen, as well as transfer students from community colleges whose completed work is equivalent to requirements in this program, can be admitted to the Cooperative Education Program.

ADMISSION TO UNDERGRADUATE STUDY

The School admits those applicants who can benefit themselves and society by disciplined intellectual effort in its environment.

Admission is the first selective step in a long series of qualifying steps the student will take in his progress toward professional competence in engineering, and indicates the School's belief that the applicant has at least the minimum preparation and ability to complete the curriculum successfully.

The applicant must be of good character and must have an academic background appropriate for the program of studies contemplated.

APPLICATION FOR ADMISSION

An applicant for admission obtains from the Office of Admissions of the University an application blank which he must fill out completely and return with the $25* application fee.

STUDENTS FROM U. S. INSTITUTIONS

Records presented become the property of the University and *cannot* be returned.

FRESHMAN ADMISSION

Consideration for admission is based on the following:

1. An acceptable certificate of graduation from an accredited high school showing at least fifteen units†;
2. The principal's statement that the applicant is prepared to undertake college work;
3. Scores on the following College Entrance Examination Board tests: the Scholastic Aptitude Test, the English Composition Achievement Test, and a Level I (Standard) or Level II (Intensive) Mathematics Test—Level I preferred.

The qualifications of applicants who, because of unusual circumstances, do not meet the above requirements will be considered by the School, which may prescribe admission tests.

Nine and one-half of the fifteen units required for entrance must be distributed as follows: three in English, two in algebra, one in plane geometry, one-half in plane trigonometry, one in physics or chemistry, and two in one foreign language or history. General science may *not* be counted in satisfaction of the science requirement but may be counted as an elective unit.

*Application fee must be by check or postal money order, payable to George Washington University. The application fee is waived for a student applying for readmission who was registered in a degree program at the time of his last registration at this University and has not since registered at another institution.

†A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods of prepared classroom work.

It is recommended that *both* physics and chemistry be studied in high scho
A high school course in solid geometry is recommended as a firm foundat
for college mathematics.

An applicant must arrange to have sent directly *from his school to the Offi
of Admissions* the academic record of his first seven terms in secondary scho
together with a personal evaluation and recommendation from his princip
This information may be supplied on a form provided by the University or
a standard form used by the secondary school provided all essential inform
tion is included.

Quantitative Deficiency.—A graduate of an approved high school who lac
not more than two units of the required subjects and who presents fifte
acceptable units may be admitted to a prescribed program which includ
courses to make up his deficiencies.

REGULAR ADMISSION

Applicants for regular admission who wish to begin study in the fall semes
should formulate plans early in the senior high school year. Although the Un
versity prefers to have applications submitted during the fall semester of th
senior high school year, applications may be submitted until March 1. Studen
graduating at midterm wishing to begin study in the spring semester must
apply no later than December 1. Applications and all required credentials
students wishing to begin study in either the first or second term of the sum
mer session must be received prior to March 1.

EARLY DECISION PLAN

To be eligible for an early decision, a student must certify that George Wash
ington University is his first-choice school and that he will accept an offer o
admission if it is extended, provided it includes adequate financial aid if such
is needed. He must also notify all other colleges at which he has initiated ap
plication that he is withdrawing his application. The application, all require
credentials, and, when appropriate, the application for financial aid must be
the Office of Admissions early in the fall and no later than November 1.
decision will be mailed by December 1. The declaration of intent to attend the
University and a $100 tuition deposit (plus an additional $100 housing deposi
for resident students), nonrefundable, must be submitted by December 15.

TRANSFER STUDENTS

Transfer students from other institutions (see page 19 for minimum residence
requirement) should submit application and required credentials prior to Au
gust 15 for the fall semester, December 15 for the spring semester, May 1 fo
the summer sessions.

The transfer student must be in good standing as to scholarship and conduct
He must be eligible to return to the last previously attended institution in the
semester for which he seeks admission to this University.

An applicant who has attended one or more institutions of higher learning
must request *each* registrar to mail directly *to the Office of Admissions of the
University* a transcript of his record, *even though credits were not earned.*

If an applicant has fewer than 30 semester hours of acceptable work (C or
better on academic work from an accredited institution), he must request that

his high school record and College Examination Board Test scores be sent to the Office of Admissions. Applicants with "marginal records" of 30 semester nours or more of work are requested to submit high school records and the College Entrance Examination Board Test scores.

STUDENTS FROM FOREIGN INSTITUTIONS

Application, required records, and scores on the *Test of English as a Foreign Language* (see below) must be received from all *foreign applicants* no later than March 1 for the fall semester and November 1 for the spring semester.

REQUIRED RECORDS

Applicants must request all educational institutions attended to send directly to the Office of Admissions of the University official credentials listing subjects studied, grades received, examinations taken, and degrees received. Certified copies of diplomas and certificates from secondary schools and all colleges and universities attended are required. Records of state examinations and certificates are also needed. All records become the property of the University and *cannot* be returned.

LANGUAGE TEST

Students whose native tongue is not English are required to take the *Test of English as a Foreign Language*. Students are responsible for making arrangements for taking the test and should address inquiries to: TOEFL, Educational Testing Service, Princeton, New Jersey 08540, U.S.A. The completed application form should be returned to the Testing Service at Princeton well in advance of the beginning of the semester for which the applicant seeks admission. The test fee, which should be remitted with the application, entitles the student to have his test score sent to three different institutions. Registration for the *Test of English as a Foreign Language* does not constitute application for admission to George Washington University

The Bulletin of Information, obtainable without charge, contains a description of the test as well as rules regarding application, fees, reports, and the conduct of the test; lists of examination centers; examination dates; and application blank. On the application for the test, the student should specify that the scores be sent to the Office of Admissions, George Washington University, Washington, D.C. 20006.

If additional tests are prescribed, necessary instructions will be sent to the applicant by the Office of Admissions.

READMISSION

A student previously registered in the University who was not registered on campus during the immediately preceding semester must apply for readmission. Final dates for applying are the same as those for "Transfer Students," see pages 14–15. If the student applies for a degree program and was previously registered as a nondegree student, or if he has attended one or more higher institutions during his absence from the University, he must have complete, official transcripts sent to the Office of Admissions from each institution attended before his application will be considered. Applications for readmission are considered on the basis of regulations currently effective.

The application fee is waived for a student applying for readmission who was registered in a degree program at the time of his last registration at this University and who has not registered at another institution since his last registration at this University.

TUITION DEPOSIT

Upon notification of acceptance, a $100 tuition deposit will be required of all full-time students including those readmitted. The deposit is credited toward tuition and is not refundable.

ADVANCED STANDING

CREDIT FOR ADVANCED PLACEMENT EXAMINATIONS

Advanced standing may be granted for study at the collegiate level in advanced courses in an approved secondary school, if substantiated by satisfactory performance in the appropriate Advanced Placement Examination of the College Entrance Examination Board. Advanced standing may also be granted as a result of satisfactory performance in the College-Level Examination Program (CLEP). Arrangement for the examinations is the responsibility of the applicant and should be made with the College Board, Advanced Placement Examinations, Educational Testing Service, 20 Nassau Street, Princeton, N.J. 08540 or 1947 Center Street, Berkeley, Calif. 94707.

The applicant must request the examining service to submit the test papers and scores to the Office of Admissions. Consideration is given to both the quality of performance on the examination and the quality and content of the course of study completed by the applicant. Credit may be withheld pending satisfactory completion of higher-level courses in the same field.

Total credit that may be so granted is up to 30 semester hours, not more than 8 semester hours of which may be in any one examination area.

CREDIT FROM HIGHER INSTITUTIONS

Advanced standing (see page 19 for minimum residence requirement) may be granted for work successfully completed at an accredited institution of higher learning. Credit will be granted for transferred work only when it meets the requirements for the degree sought at this University. Only work of passing grade (*C* or higher) will be considered for transfer.

CREDIT FROM TECHNICAL INSTITUTES

Advanced standing may be granted for work successfully completed at technical institutes. Credit will be granted for transferred work only when the applicant passes successfully the required validation examination. Arrangement for the examination should be made with the appropriate Department of the School. In any event, no more than 30 semester hours of credit for technical work will be granted in transfer for those who graduated from a two-year technical institute. A maximum of 60 semester hours of credit for technical work may be granted in transfer for those who graduated from a four-year technical institute.

VICE SCHOOL CREDIT

imited amount of credit earned in service schools since 1941 may be consid- for assignment to qualified degree candidates in the School of Engineering Applied Science. Veterans should submit to the Office of Admissions otostatic copies of their service school records, indicating courses success- y completed with sufficient identification of the course to locate it in the *de to Evaluation of Educational Experience in the Armed Forces.*

REGULATIONS

gulations regarding REGISTRATION, FEES AND FINANCES *are stated on pages -31; other University regulations, on pages 136–40.*

TENDANCE

tudent may not attend classes until registration is completed and fees due paid. He may attend only those classes for which he is registered. Regular ndance is required. A student may be dropped from any course for undue nce.

A student suspended for any reason may not attend classes during the period uspension.

The student is expected to attend every meeting of the course in which he egistered, fully prepared to carry on the work required. The student is held onsible for all work in the course, and all absences must be excused before vision will be made for him to make up the work missed. Excuses for ab- es from examinations which have been announced in advance can be ob- ed only by written application to the instructor in charge of the course.

DEMIC WORK LOAD

ull-time undergraduate student who is not on probation may register for no e than 20 semester hours. A student employed more than 24 hours a week is not on probation may take no more than 10 semester hours. In excep- al cases these limits may be exceeded with the Dean's permission.

A student previously unemployed who accepts employment after registration t immediately report that fact to the Dean so that his schedule may be sted if necessary.

ISORY SYSTEM

School of Engineering and Applied Science encourages a close faculty- ent relationship. Every entering undergraduate student is assigned a perma- faculty adviser to assist him in orienting himself in the professional dis- ine. Faculty advisers counsel students on their programs of study, the evement and maintenance of satisfactory scholastic performances, profes- al development, and extracurricular activity as part of the educational proc- The adviser represents the student in all cases requiring faculty action.

udents must obtain their advisers' approval of programs of study prior to stration. Until a student has completed the work required for the degree nust consult his adviser in all academic matters. However, an adviser may

not deny a student entry into any course or activity to which he is entitl under the regulations of the School.

All students are encouraged to discuss college problems with their adviser or instructors at any time; and parents or guardians are invited to consult wi the Dean, Department Chairman, and advisers concerning any student prob lems.

Faculty advisers discharge their counseling duties in accordance with th high principles of their professional responsibility; however, the final respon sibility for a student's action lies wholly with the student.

SCHOLARSHIP

For scholarship requirements for graduation, see "Graduation Requirements pages 138–39.

Grades.—Grades are mailed to the student through the Office of the Regi trar at the close of each semester.

The following grading system is used: *A*, excellent; *B*, good; *C*, passing; *F* failing. Whenever a grade has not been assigned, the symbol *I* (incomplete) o the symbol *W* (authorized withdrawal) is recorded.

An *I* (incomplete) grade is given by an instructor only for reasons satisfac tory to the instructor and presented to him before the last day of classes for the semester in which the course is given. At the option of the instructor, the grade of *I* may be recorded if a student, for reasons beyond his control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class at tendance in the course have been satisfactory. Any failure to complete the work of a course which is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded *F*. If acceptable rea sons are later presented to the instructor, he may initiate an appropriate grade change. Although the grade of *I may* remain on the records for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work (usually the final examination or required paper) must be made up. The grade of *I* cannot be removed by reregistering for the course here, or by taking its equivalent elsewhere. An *I* cannot be made up after the lapse of one calendar year except by written permission of the Dean's Council.

Mid-semester Warning.—At the end of the seventh week of each semester, instructors report to the Dean the names of students whose scholarship is un satisfactory. On receipt of a warning notice the student must consult his in structor and his adviser immediately.

The adviser may prescribe diagnostic tests and/or remedial study to be com pleted before the end of the current semester.

Probation.—A student who receives two grades or more of *F* in one se mester will be placed on probation. This probation extends over the period in which the student completes a minimum of 12 semester hours of study and may be extended over a longer period. If a student earns a grade of *C* or better in all courses taken during the period of probation, he is removed from probational status. If he receives one grade of *F* while on probation, the pro bationary period is extended for a semester.

Upon being placed on probation, a student may elect to undertake the Engi

neering Student Probation Program of testing, counseling, and remedial work available at the Counseling Center. If this program is undertaken, the student is continued on probation until his scholastic deficiency is removed. However, students may be continued on probation in this program no longer than four semesters. At the end of this period, each student's case is reviewed in accordance with the general rules concerning probation and suspension.

A student on probation is required to follow a specified program of study, including remedial studies as prescribed, and is not eligible to participate in student activities.

Suspension.—If a student receives one or more grades of *F* in a second semester of probation, he will be suspended, unless he is participating in the Engineering Student Probation Program.

A student suspended for poor scholarship may apply to be readmitted in the semester or summer session which begins next after an interval of one calendar year. A student readmitted after suspension is on probation. In no case will the probationary period after readmission exceed 24 hours of study. A student suspended twice for poor scholarship will not be readmitted.

DEAN'S HONORS LIST

The Faculty of the School recognizes meritorious scholastic achievement by a Dean's Honors List, containing the names of candidates for undergraduate degrees whose scholastic achievement satisfies all of the following requirements:

1. The completion of a minimum of 13 semester hours in one semester, with the total number of hours in which the grade of *A* is earned being at least equal to the total in which the grade of *C* is earned.
2. No grade below *C* has been received during the qualifying period.
3. No disciplinary action has been taken in respect to the student.

The Dean's Honors List is prepared at the end of the fall and spring semesters and displayed in an appropriate public place in the School. A notation is made on the student's record each time his name is included in the List.

USE OF CORRECT ENGLISH

Any student whose written or spoken English in any course is unsatisfactory may be reported by the instructor to the Dean. The Dean may assign supplementary work, without academic credit, varying in amount with the needs of the student. If the work prescribed is equivalent to a course, the regular tuition fee is charged. The granting of a degree may be delayed for failure to make up any such deficiency in English to the satisfaction of the Dean.

GRADUATION REQUIREMENTS

See pages 138–39 for general requirements for graduation.

RESIDENCE

A minimum of 30 semester hours must be completed in residence. Summer work may be counted. Unless special permission is granted by the Dean to study elsewhere, the work of the final year must be completed in residence.

QUALITY-POINT INDEX

The quality-point index, which is computed to determine scholastic eligibility for graduation (see below), is obtained by dividing the number of quality points by the number of semester hours for which the student has registered.

Quality points are computed from grades as follows: *A*, four points; *B*, three points; *C*, two points; *F*, no points, for each semester hour for which the student has registered. Courses marked *W* or *I* are not considered in determining the index, except that courses marked *I* will be considered when a formal grade is recorded. Grades in courses taken at another institution are not considered in computing the quality-point index.

SCHOLARSHIP

To be eligible for graduation a student must have a quality-point index of at least 2.20 in those technical courses specified in the fifth through the eighth semester of his curriculum.

HONORS

With Distinction.—A Bachelor's degree may be conferred "With Distinction," at the discretion of the Faculty, if a student attains a quality-point index of 3.50 or higher on all work taken at this institution. To be eligible for this honor a student must have completed at this institution at least one-half of the work required for the degree.

Special Honors.—A Bachelor's degree may be conferred with "Special Honors," at the discretion of the Faculty, for outstanding achievement in the student's senior year work on recommendation of the Faculty, under the following regulations:

1. The student must have his candidacy for Special Honors approved by the department chairman representing his major field not later than the beginning of his senior year.
2. The student must meet such other conditions as may be set at the time his candidacy is approved.
3. No student will be awarded Special Honors unless he has a quality-point index of at least 3.00 on all work taken at this institution.
4. To be eligible for Special Honors a student must have completed at this institution at least one-half of the work required for the degree.

UNDERGRADUATE CURRICULA

The four four-year curricula lead to the degree of Bachelor of Science, with parenthetic designation of the major; for example, Bachelor of Science (Electrical Engineering). Students who are deficient in preparation require a longer period; those who are admitted with advanced standing or who attend summer sessions can complete the requirements in less time.

The program of the first four semesters (2 years) is common to all curricula and provides the essential broad base of scientific principles and mathematical techniques necessary for the professional courses of the last four semesters, together with an appropriate background in the humanities and social sciences (see page 21).

A minimum total of 130 semester hours is required to qualify for the degree. However, students are encouraged to elect additional course work above the required minimum to the extent that their interests and the School's offerings permit.

Degrees are offered in Civil Engineering, Electrical Engineering, and Mechanical Engineering. Students in Electrical Engineering may select an area of concentration in Computer Science. Students in Civil Engineering may select an area of concentration in Environmental Civil Engineering.

The student is assisted by his faculty adviser, who approves his program each semester prior to registration. For the guidance of the student and his adviser, every beginning student takes the School's placement examinations in English, reading, algebra, and trigonometry and, if deficient in any of these areas, must take remedial work in the area of deficiency.

COURSES IN THE HUMANITIES AND SOCIAL SCIENCES

The basic purpose of a program in the humanities and social sciences for engineering students is to assist the student in acquiring knowledge which will permit him to understand the social and humanistic elements of the past and present and to analyze the problems facing his society today. The ultimate goal is to help the engineer have a better understanding of his society and an appreciation of his role and responsibilities within it.

Since the education of an engineering student is, by necessity, oriented toward technical subjects, his program in the humanities and social sciences should not emphasize technical aspects and skills, but should rather consist of courses which can broaden his outlook and motivation toward sociological and humanistic sensitivities. As a consequence, courses in subjects such as accounting, finance, industrial management, introductory languages, and personnel administration should not be included in the humanities and social sciences program. On the other hand, courses in areas such as anthropology, economics, fine arts, geography, history, literature, philosophy, political science, psychology, and sociology are considered appropriate.

Each engineering student is required to prepare, with the assistance of his faculty adviser, a program of courses in the humanities and social sciences, explaining how his program meets the purpose stated above. The student's program must include a minimum of 18 semester hours and must be approved by both his adviser and department chairman.

Graduate Study

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE offers graduate study leading to the degrees of Master of Science, Master of Engineering Administration, and Doctor of Science.

In its graduate programs, the School, as it does in undergraduate study, adheres to the educational philosophy of increasing the knowledge and understanding of the individual student by concentration on principles and their application rather than by encyclopedic coverage of techniques and specialized detail. Each program is individually planned according to the student's preparation and needs.

Graduate study may be undertaken in any field of engineering or applied science in which the School has adequate facilities and resources. Upon approval, the student may select courses in other departments of instruction in the University in order to serve specific needs or objectives. A complete list of available fields and areas of concentration is included under each departmental listing in the "Programs of Study and Courses of Instruction" section of this catalogue (pages 39–124).

THE MASTER'S PROGRAMS

The student's program may provide for broad coverage in a variety of fields or may be designed to provide a concentration in particular areas. The minimum program consists of 24 semester hours of approved graduate courses and a Master's thesis (equivalent to 6 semester hours). With the approval of the Department, the student may elect an optional program without a thesis which consists of a minimum of 33 semester hours of approved graduate courses. All Master's candidates are required to pass a Master's Comprehensive Examination. Students whose undergraduate study does not include necessary prerequisites may be required to take more than the minimum semester hours required.

Upon admission the student is assigned an adviser. Programs of study are determined by any prerequisites established and the requirements of the department in which the student wishes to study. The program of studies in preparation for the Master's Comprehensive Examination must be approved by the student's adviser and the appropriate department chairman.

ADMISSION

Admission to graduate study toward a Master's degree requires an appropriate Bachelor's degree from a recognized institution and evidence of capacity for productive work in the field selected, as indicated by undergraduate grades, Graduate Record Examination scores, and similar data.

An applicant who has significant deficiencies in preparation may be required to take prescribed undergraduate courses as an unclassified student before being admitted to graduate student status. In some cases, if such deficiencies are minimal, he may be admitted to graduate student status and allowed to take a limited number of graduate courses while completing the undergraduate courses in which he is deficient. In no case may the undergraduate courses thus taken fulfill any part of the requirements for the Master's degree.

For additional admissions requirements for the degrees of Master of Engineering Administration and Master of Science in the Department of Engineering Administration, see pages 105, 108; for the degree of Master of Science in the Department of Operations Research, see page 116. Candidates for the degree of Master of Science in the Department of Electrical Engineering and Computer Science must have satisfied specific undergraduate requirements, depending upon the area of concentration. Students should consult the special brochure *The Graduate Programs of the Department of Electrical Engineering and Computer Science.*

ADMISSION PROCEDURE

Forms for application for admission are available at the School of Engineering and Applied Science. They must be submitted, together with the nonrefundable application fee of $25, to the Director of Engineering Admissions, Room 100, Tompkins Hall of Engineering, George Washington University, Washington, D.C. 20006, no later than September 1 for the fall semester, December 15 for the spring semester, May 1 for the first summer session, and June 1 for the second summer session. The applicant must request each educational institution attended since high school graduation to send an official transcript of his record directly to the Director of Engineering Admissions. If the applicant has completed the Graduate Record Examination, he should request that his scores be sent to the School. The applicant will be notified by mail when a decision on his admission has been made. Foreign students are required to take the *Test of English as a Foreign Language* (see page 15).

All inquiries and correspondence relative to graduate admission should be directed to the Director of Engineering Admissions.

TRANSFER CREDIT

Up to 6 semester hours of satisfactory credit (with grades of *A* or *B*), which normally must have been earned in a graduate program at another recognized institution, *may* be accepted in transfer, when applicable, to satisfy Master's degree requirements in this School. However, the student must, with the approval of his adviser, petition to the appropriate department chairman for such transfer.

REGISTRATION

A graduate student may register for classes when he presents an official letter of admission or his student identification card from the previous semester. No registration is accepted for less than a semester or one summer session.

Concurrent registration in this School and in another institution not a member of the Consortium of Universities of the Washington Metropolitan Area, Inc., or another division of this University requires the written permission of the Deans concerned, *prior to registration*. Allowance of credit for work done concurrently at another institution is at the discretion of the Dean.

Dates and hours of registration are stated in the Calendar, page 4, and in the *Schedule of Classes* published in advance of each semester.

MASTER'S THESIS

The degree candidate must submit an acceptable thesis to demonstrate his ability to make independent use of the knowledge and discipline of thought acquired and developed by graduate study, to furnish objective evidence of constructive power in a given field, and to demonstrate that he can communicate the results of his work in writing. Work of a suitable character for which the student has professional responsibility may be considered, whether done on or off campus, provided no significant amount of work is completed without faculty supervision.

As a part of registration for the thesis course 299, the candidate must submit to the appropriate department chairman (on the form obtainable at the School

office) his thesis area, approved by his faculty adviser. He must submit thesis title to the Dean, on the form available in the School office, at beginning of the semester in which he expects to graduate. Registration thesis 299–300 entitles the student, during such registration, to the advice the member of the faculty under whom the thesis is to be written. He consult his adviser, but the thesis is the exclusive responsibility of the stud

The thesis in final form must be submitted to the appropriate departm chairman by the date stated in the calendar for the semester in which the didate enrolls in thesis 300. In case a thesis is unfinished on the date specifi the student will be granted an additional semester and must pay the "Contin ous Registration" fee (see page 128) unless he is registered for course work the preparation of the thesis extends beyond the three semesters, approval an extension of time will be required and the student must reregister for the 300 and pay tuition as for a repeated course. The over-all time limit for ear ing the degree (see pages 25–26) may not be exceeded.

A thesis may be submitted in final form one time. The acceptability of th thesis is determined exclusively by the Master's Comprehensive Examinatio committee. If the thesis is unacceptable, the student's graduate status is ter minated.

Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the School. Accepted theses, with ac companying drawings, become the property of the University and are deposited in the University Library, where the duplicate copies are bound and made available for circulation. Permission to publish or adapt material in them must be secured from the Dean.

OPTIONAL MASTER'S PROGRAM WITHOUT A THESIS

With the approval of the Department, the student may elect an optional pro gram without a thesis which consists of a minimum of 33 semester hours of approved graduate courses.

MASTER'S COMPREHENSIVE EXAMINATION

After completing his prescribed program, the candidate must pass a Master's Comprehensive Examination, to demonstrate substantial understanding of principles and method and their use in the area of his interest. This Examination may be written, oral, or both. A graduate student who fails any portion of the Master's Comprehensive Examination on his first attempt may be examined one more time if approval is given by the appropriate Examining Committee. In the event of failure to complete the Examination satisfactorily, the student's graduate status terminates.

REGULATIONS

Regulations regarding REGISTRATION, FEES AND FINANCES *are stated on pages 125–31; other University regulations, on pages 136–40.*

ATTENDANCE

A student may not attend classes until registration is completed and fees due are paid. He may attend only those classes for which he is registered. A student is expected to attend every meeting of the course in which he is regis-

tered, fully prepared to carry on the work required. A student may be dropped rom any course for undue absence. Excused absences must be arranged with he instructor.

SCHOLARSHIP

Grades are indicated as *A*, excellent; *B*, good; *C*, minimum pass; *F*, fail; and *CR*, credit for satisfactory thesis completion. Whenever a grade is not assigned, the symbol *I* (incomplete) or the symbol *W* (authorized withdrawal) is recorded.

At the option of the instructor, the grade of *I* may be recorded if a student, for reasons beyond his control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course which is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded *F*. If acceptable reasons are later presented to the instructor, he may initiate an appropriate grade change. Although the grade of *I* may remain on the records for a maximum of one year, the instructor should normally set a much briefer period within which the uncompleted work must be made up. The grade of *I* cannot be removed by reregistering for the course here, or by taking its equivalent elsewhere. An incomplete which is not removed within one calendar year is automatically changed to an *F*.

A student may not repeat for credit a course in which he has received a grade of *C* or above, unless required to do so by the department concerned. A written statement requiring the student to repeat such a course for credit must be submitted to the Registrar by the appropriate department chairman.

For Master's work, a minimum of 24 semester hours (for those who receive credit for a thesis) or 33 semester hours (for those who follow the optional program without a thesis) of graduate course work with the grade of *B* or higher is required for graduation. Students who receive two grades of *F*, or (except those registered prior to and in continuous residence since the 1967 fall semester) three grades below *B*, are barred from further enrollment in graduate courses and, ordinarily, will not be readmitted to graduate study. Students who receive the grade of *C* in one or two courses are required to take additional course work to make up the minimum semester hours of work with grades of *B* (except those registered prior to and in continuous residence since the 1967 fall semester).

RESIDENCE

In general, a minimum of one year of full-time study, or the equivalent in part-time study, must be completed in the School.

TIME TO COMPLETE MASTER'S DEGREE REQUIREMENTS

A full-time student in the Master's program is allowed a maximum of three calendar years to complete all degree requirements, from the date of his first graduate-student status registration in prerequisite or graduate courses. A part-time student in the Master's program is allowed a maximum of five cal-

endar years. The time limit does not include any period of registration as an unclassified student before admission to graduate student status, nor does it encompass any specified period spent on approved leave of absence. Readmission is required upon expiration of leave of absence under the conditions and requirements then prevailing.

Students who do not complete degree requirements within the allowed time have their graduate status terminated. They may be readmitted to graduate status under conditions specified by the department chairman and approved by the Dean.

THE DOCTORAL PROGRAM

The School of Engineering and Applied Science offers a program of advanced study and research leading to the degree of Doctor of Science. This program is limited to those fields in engineering or applied science in which a discipline has been established and for which the University has or can arrange adequate resources.

The doctoral program is designed to prepare the student for a career of creative scholarship by providing a broad but balanced background of knowledge and guidance in the performance of research. It requires study of interrelated fields of learning as well as original research in the field of central interest.

The program for the degree is divided into two stages. The first—made up of a study of interrelated fields of learning which supports the general area of research concentration—culminates in the qualifying examination. The second—composed of research investigation of a particular subject in a special field and the presentation of such research findings in a written dissertation—culminates in the final examination.

ADMISSION TO DOCTORAL STUDY

A satisfactory Master's degree from an accredited institution is required, together with acceptable personal qualities and a capacity for creative scholarship. Normally, a *B* average in graduate work is required. However, the minimum does not assure automatic acceptance; the departments may, and often do, set higher admission standards.

APPLICATION FOR ADMISSION

The prospective doctoral student seeking admission should apply before June 1 for the fall semester and before December 1 for the spring semester. Personal interviews may then be arranged to discuss the applicant's qualifications and the possibilities for an effective doctoral program. The applicant must arrange for complete documentary records (transcripts) to be forwarded to the Director of Engineering Admissions in sufficient time to permit assembly of complete records for evaluation as soon after the above application deadlines as possible.

The applicant must arrange for letters of recommendation to be submitted from two faculty members of the institution from which he received his Master's degree; one of these, if possible, should be from his Master's adviser. The letters should be addressed to the appropriate department chairman.

LANGUAGE REQUIREMENT

A doctoral student should maintain a broad outlook as he pursues his study, and therefore must have the capability of reading appropriate literature published in a foreign language. Accordingly, a reading knowledge of one foreign language, preferably Russian, must be demonstrated before admission to the qualifying examination. If the student wishes to satisfy this requirement with a language other than Russian, he must obtain the approval first of his doctoral adviser, then of his department chairman; permission to use a language other than Russian will be granted on the basis of its importance to the student's field of interest.

TOOL REQUIREMENT

In addition to the language requirement, an examination in a tool requirement (e.g., computer programming) may be established by the various departments.

STUDY FOR THE QUALIFYING EXAMINATION

Upon admission to the first stage of the program, i.e., study of interrelated fields culminating in the qualifying examination, the student is assigned a faculty adviser who directs his studies.* The adviser approves appropriate fields of study to insure the student's breadth of knowledge and to support research in his central field of interest, advises him concerning the scope and content of his fields of study, and guides him in preparing for the qualifying examination. Programs of study are normally structured to include a major field of study and two minor or supporting fields.

A minimum of 30 semester hours of credit in a formal program at the graduate level beyond Master's study is required. In many cases, particularly in those in which the student undertakes a doctoral program in a field other than that in which he obtained his Master's Degree, the program of studies exceeds 30 semester hours.

Students admitted to doctoral study are encouraged to undertake one year of full-time study on campus. In general, the adviser will require the student to register for a minimum of 6 semester hours of course work in every semester except the summer sessions.

TRANSFER OF CREDIT

Up to 6 semester hours of credit earned in courses completed with the grade of *A* or *B* while enrolled in a doctoral program at another accredited institution may be accepted in transfer to satisfy doctoral requirements of this School, subject to the approval of the student's adviser and his department chairman. Credit earned in courses completed more than five years prior to admission to the doctoral program will not be accepted in transfer, and some departments may require that transfer credit must have been earned within a shorter period of time before admission.

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*In some departments, instead of a faculty adviser, a faculty committee may be appointed to approve programs, direct study, and carry out all other responsibilities of the faculty adviser.

THE QUALIFYING EXAMINATION*

The purpose of the qualifying examination is to ascertain that the studen breadth of background and intellectual development are adequate to suppo doctoral research in his central field. Qualifying examinations may be writt or oral, or both, and are scheduled over a period of several days. They a conducted only during the fall and spring semesters on dates established by t departments and are administered by a faculty committee. Upon favorable re port of the examiners to the Dean through the appropriate department cha man, the student is admitted to candidacy for the degree; he then begins h specialized study and research under the supervision of a designated member the faculty or, in special instances, an outstanding engineer/scientist who is no a member of the faculty.

The qualifying examination is the principal means used to determine th student's ability to qualify as a candidate for the doctoral degree and to enter the second stage of his program.

At the discretion of the committee which prepared the examination, the doc toral student may be given a second opportunity to qualify for candidacy in the event of failure in any part of the qualifying examination. In general, the entire qualifying examination must be retaken by the student in order to qual ify for candidacy.

SCHOLARSHIP

To be admitted to the qualifying examination, the doctoral student must achieve an over-all academic average of 3.20 on a scale of 4 (a grade of *A* equals 4 points; *B*, 3 points; *C*, 2 points; and *F*, 0 points). No doctoral student may receive more than two course grades below *B*. If he does receive more than two course grades below *B*, his graduate study is terminated and his further enroll ment prohibited. Courses in which the student earns grades below *B* are not included in his total semester-hour requirement for the degree. In the event a student receives any grade below *B*, he is required to consult with his adviser for a review of his program of study and discussion of possible changes therein.

RESEARCH, DISSERTATION, FINAL EXAMINATION

The student admitted to candidacy for the degree of Doctor of Science requests as Director of Research the member of the faculty under whom he wishes to conduct his research. The faculty member may accept or reject such request. The research area is approved by the Director and the appropriate department chairman. Throughout the remainder of the doctoral program the candidate works directly under his Director in his dissertation research. However, the student is not precluded from consulting with other members of the faculty, as may be required, on an informal basis, and may be encouraged to do so by his Director of Research. A committee of the faculty consisting of three members including the Director as chairman will assist in supervising the final prepara tion of the dissertation. The department chairman appoints such a committee on the recommendation of the Director of Research. Work on the dissertation is equivalent to a minimum of 24 semester hours.

* Some departments may administer a pre-qualifying examination prior to completion of the study program.

THE DISSERTATION

A dissertation is required as evidence of ability to perform original scholarly research and to present and interpret the results. The student is solely responsible for the content of his dissertation.

The aim of the student in this stage of his candidacy is the production of a dissertation which embodies the results of an extended study original in nature and which includes material deemed worthy of publication in recognized scientific and engineering journals. The student is expected to attempt to publish the results of his research as soon as possible after he receives his degree and to submit copies of the published material to the Dean. Credit must be given in the publication to the fact that the material is abstracted, summarized, developed, etc., from a dissertation submitted to George Washington University in partial fulfillment of the requirements for the Doctor of Science degree.

The candidate must submit to the appropriate department five complete copies of the dissertation and two original copies of an abstract (not to exceed 600 words) of his dissertation no later than the date specified in the calendar. One copy of the abstract is for inclusion in the announcement of the examination and one for reproduction by University Microfilms, Inc. One copy of the dissertation is also sent to University Microfilms, Inc.

Printed copies of detailed regulations regarding the form and reproduction of the dissertation, preparation of the abstract, and services offered by University Microfilms, Inc., are available at the School Office. The successful candidate for the doctorate is required, before receiving his degree, to pay a fee to cover a part of the expense of printing the abstract of his dissertation, and for the basic service rendered by University Microfilms, Inc. Accepted dissertations, with accompanying drawings, become the property of the University and are deposited in the University Library where bound copies are available for circulation.

THE FINAL EXAMINATION

Upon acceptance of the dissertation by the committee, consisting of the Director and two other faculty members of this School, which has assisted in supervising its final preparation, the candidate is presented for his final examination. The final examination is oral and is open to the public. The candidate must demonstrate a mastery of his special fields of study and of the materials and techniques used in the research. The committee of examiners will consist of not less than five members, three of whom must be members of the faculty on full-time service. The committee may include qualified experts brought to the University especially to participate in the examination. The Director of Research serves as Advocate for the candidate. When the candidate satisfies the examining committee of the high quality and originality of his contribution to knowledge as well as his mastery of the scholarship and research techniques of his field, the committee of examiners recommends him for the degree of Doctor of Science. The final examination is conducted only during the fall and spring semesters. The candidate should consult with the appropriate department chairman as to possible dates for the examination.

RESIDENCE AND CONTINUOUS STUDY

All the work for the degree must be done in residence (on the campus), ex-

cept when special permission is granted by the chairman of the depa
The student must maintain continuous registration in the School. Failur
so breaks the student's registration, and he must apply for readmission
toral study under whatever conditions and regulations are in effect at tha
In case of incapacity or other legitimate reasons, the student may be gra
leave of absence of up to one year. Extension of such leave will requi
cial request to and approval of the appropriate department chairman.
approved leave of absence, the student must maintain continuous re
tion. The time period for completion of all requirements for the degree
adjusted on the basis of the approved leave of absence.

In general, one year of study is the minimum amount of time to be sp
preparation for the qualifying examination. The qualifying examination
be completed within five years of the date of admission, and the entire
program must be completed within seven years. After admission the st
may apply for his qualifying examination whenever he believes that he is
erly prepared. A minimum of two years of full-time study and research s
be expected in meeting the requirements for the degree.

Special Programs

INSTITUTE FOR THE STUDY OF FATIGUE, FRACTURE, AND STRUCTURAL RELIABILITY

THE INSTITUTE for the Study of Fatigue, Fracture, and Structural Reliabilit
the School of Engineering and Applied Science is under the technical direc
of Dr. A.M. Freudenthal, an internationally recognized authority. The
objective of the Institute is to develop an interdisciplinary approach to fati
research through close cooperation of research workers from different fie
The Institute deals principally with the study of the physical mechanism
damage initiation, in order to establish principles for the rational design
metal alloys of superior fatigue performance on the one hand, and to deve
advanced methods of fatigue design and reliability on the other. Because
the large volume, past and current, of straight fatigue testing of standard
specimens in industrial, government, and university laboratories, no testing
this type is generally conducted by the Institute. However, results of such te
appearing in publications and reports are carefully scrutinized for their sign
cance in terms of the purposes of the Institute. In addition to advancing int
disciplinary research, the Institute provides specialized training for gradua
students.

The Institute conducts seminars, issues technical reports, and supplies info
mation, lectures, and consultations to many government and industrial researc
and development laboratories.

INSTITUTE FOR MANAGEMENT SCIENCE AND ENGINEERING

The Institute for Management Science and Engineering defines and develop
new management techniques required to keep pace with our ever-expandin
technology. It provides a multidisciplinary environment for innovative grad
ate teaching and substantial opportunities for research activities and publi
service under diversified sources of external support. The principal academi

fields directly involved are operations research, management science, and the computer sciences.

The programs of the Institute are concerned with important educational and public-service needs for conservation of national resources. Such programs require full-time interaction among students, faculty, and staff in ways possible only at universities. The Institute works closely with the University's Program of Policy Studies in Science and Technology in the application of developing technologies to contemporary problem areas. Through its Program in Logistics, the Institute performs research leading to the development of a science of logistics featuring principles and methodology for resource allocation problems in civil affairs and national defense efforts.

Participation by faculty members and graduate students from all schools of the University is encouraged as consistent with the multidisciplinary objectives of the Institute. Graduate students are supported through research assistantships with thesis and dissertation efforts ordinarily being the major work responsibilities. Reliance is also placed on staff research specialists, and there are special provisions for substantial contributions from "distinguished visitors" from government, private industry, and other universities.

The Institute disseminates its results through seminars, colloquia, conferences, and a special series of monographs. All of the research is unclassified.



THE GWU—NASA-LANGLEY GRADUATE PROGRAM

George Washington University, in cooperation with the National Aeronautics and Space Administration's Langley Research Center, has a full-resident graduate engineering program at NASA-Langley, in Hampton, Virginia, approximately 200 miles south of Washington, D.C.

The program is open to qualified NASA employees and area residents. Courses may also be taken by nondegree students, with the approval of the instructor. Students may be permitted to transfer a maximum of 6 semester hours of approved graduate course credit from other accredited institutions.

Courses in the program are taught by NASA scientists and engineers and the faculty of the School of Engineering and Applied Science. NASA-Langley's extensive scientific and engineering facilities and equipment are utilized whenever feasible.

The program at NASA-Langley leads to the degrees of Master of Science and (by special permission of the appropriate department chairman) Doctor of Science in the fields of acoustics, aerospace engineering (including options in aeronautics and astronautics), applied mechanics, computer-aided structural design, computer science, electrical engineering, flight sciences, materials engineering, and mechanical engineering.

Information rgarding this program may be obtained from John L. Whitesides, Coordinator, GWU-NASA Program, Mail Stop 121A, NASA-Langley Research Center, Hampton, Virginia 23365.



E GWU—NASA-LANGLEY PROGRAMS IN ACOUSTICS, FLIGHT SCIENCES, AND MPUTER-AIDED STRUCTURAL DESIGN

umber of Research Scholar Assistantships are available to qualified students graduate study and research leading to the degrees of Master of Science in fields of acoustics, flight sciences, and computer-aided structural design, and tor of Science in the field of acoustics.

cooperative research and educational group, consisting of graduate stu- Research Scholar Assistants, faculty from George Washington University the Institute of Sound and Vibration Research of Southampton University, land, and scientists and engineers from the NASA-Langley Research Center, ipate in these programs. The education and research opportunities offered hese programs uniquely combine the academic resources of George Wash- on University and the real world of research of NASA.

udents use the extensive scientific and engineering equipment and facilities e NASA-Langley Research Center and associate with NASA-Langley scien- and engineers and visiting scholars from Southampton University who are king on related problems. It is believed that the experience of the Research olar Assistants during their stay at Langley will be highly rewarding and benefit them throughout their future careers. Several second-year Research olar Assistants have already had their research findings published as NASA rts; others have presented papers at scientific meetings.

ean Harold Liebowitz of the School of Engineering and Applied Science incipal Investigator for these programs.

he *Acoustics Program* is concerned with the problems of alleviating noise providing a technical base for acceptable design of ground transportation ms, noise resistant structures, aircraft, and space vehicles.

e *Flight Sciences Program* deals with advanced flight concepts of aircraft V, STOL, including areas in flight dynamics, instrumentation, guidance and ol, aeroelasticity, and systems analysis.

e *Computer-aided Structural Design Program* is designed to provide a working knowledge of advanced computer applications in interdisciplinary ptimum design of aircraft, aerospace, and other structures.

search Scholar Assistants who are candidates for the degree of Master of ce receive stipends of up to $6,500 a year; those who are candidates for egree of Doctor of Science receive stipends of up to $7,500 a year.

ditional information concerning these programs may be obtained from ssor S.W. Yuan, School of Engineering and Applied Science, George ington University, Washington, D.C. 20006.

GWU—NSRDL GRADUATE PROGRAM

ff-campus graduate program has been initiated in cooperation with the l Ship Research and Development Laboratory, Annapolis, Md. Programs dy lead to a Master's degree in the fields of electrical engineering, engi- g administration, and ocean engineering. The programs are open to all ied applicants in the Annapolis area. Students not seeking a degree may er for courses offered in this program providing they have the approval e faculty adviser at the time of registration. For additional information, to the Director of Engineering Admissions, School of Engineering and ed Science, George Washington University, Washington, D.C. 20006.

COOPERATIVE EDUCATION PROGRAM IN ENGINEERING

Arrangements have been made or are in progress with many businesses, indu trial organizations, and governmental agencies for employment opportunit that will permit the student to obtain professional experience in his techni area of interest before graduation. Although earnings through the cooperat program help the student in financing his college education, the principal pu pose of industrial internship is educational rather than financial. The studen obtains professional development through actual experience, skill in huma relations, a sense of responsibility for his own efforts, and an ability to depe on his own judgment. Several Navy laboratories are already participating the Cooperative Education Program (see below), and arrangements are no in progress to extend it to the National Bureau of Standards, COMSAT, th Federal Highway Administration, the U.S. Coast Guard, the U.S. Postal Ser ice, NASA-Goddard Space Center, IBM, and others.

For additional information, write to Coordinator, Cooperative Educatio Program in Engineering, School of Engineering and Applied Science, Georg Washington University, Washington, D.C. 20006.

COOPERATIVE PROGRAM WITH NAVY LABORATORIES

Arrangements have been made with the U.S. Naval Ship Research and Deve opment Center, Carderock, Md., and its several branch laboratories, and wit the U.S. Naval Weapons Laboratory, Dahlgren, Va., in which it is possible fo the student to earn more than $10,000 on planned technical work assignments obtain a Bachelor of Science degree in such areas as civil, electrical, or me chanical engineering, and be in a preferred position upon graduation to obtai a permanent Civil Service position with a grade and salary commensurate wit the student's education and experience.

Tuition, textbooks, and fees (exclusive of room and board) up to 50 per ce may be granted on request. If tuition assistance is received, the cooperativ student must agree to serve as a government civilian employee after graduation for a period equal to the period for which tuition is granted.

To participate in the program at the Naval laboratories, the student must b academically acceptable to the University and must meet the requirements o the Civil Service Commission for employment at these laboratories.

CONTINUING ENGINEERING EDUCATION

> The future of the engineering profession will depend to a considerable extent on the demonstrated competence of individual engineers to make optimum use of the latest scientific and technical knowledge in dealing with current and future problems. Participation in programs of continuing engineering studies will ensure that such competence can be maintained.*

The School of Engineering and Applied Science is meeting the need expresse above with a comprehensive program. The objective of the program is to en hance the competence of practicing engineers rather than to aid in their attain ment of academic degrees. Tuition for the noncredit courses offered in the program is usually paid by the employers, who recognize the necessity for im mediate improvement in the employee's on-the-job capability. The economi

* Society for Engineering Education, *Final Report: Goals of Engineering Education* (Washington D.C.: January, 1968).

eze of the past several years has forced staff reorganizations in industry
d government which have required many engineers to change their specialties
o take on additional duties within their present jobs; consequently, continu-
engineering education is required to provide the skills necessary for these
ges. Continuing engineering education also aids in qualifying for promo-
n.

The program presents about 50 noncredit courses each year. A majority of
last for five days (30 classroom hours), while others last for two, three,
or ten days. Some courses are presented in the evening (two-hour ses-
s once a week for eight to ten weeks). In a number of courses, presenta-
n of theory is augmented by workshops to give participants practice in the
lication of the particular discipline. Students from all over the nation and
m Canada, Mexico, and England have participated in courses. Their variety
xperience and background enhances the value of the discussions and en-
es their relationships with each other and with their instructors.

ubjects which have been presented in this program include engineering
agement, system safety, air pollution control, engineering mathematics and
stics, solid waste management, structural dynamics, heat pipes, standards
calibration laboratories, laser technology, noise control, fracture and fa-
e, technical writing, clinical engineering, antennas, communications systems,
ocean engineering. New courses are added as needs become apparent in
ous fields.

addition to the distinguished faculty of the School of Engineering and
lied Science, outstanding lecturers and instructors from other universities,
industry, and from government laboratories and agencies have served on
nstructional staff of the program.

he program also offers noncredit contract courses off-campus specifically
red for the needs and background of the engineers employed by the con-
ting company or agency. Tuition for these courses is considerably lower
for those offered at the University.

o receive announcements or additional information on the program, write
ontinuing Engineering Education Program, School of Engineering and
lied Science, George Washington University, Washington, D.C. 20006.

Administration

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ience

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Advisory Council*

THE PURPOSES of the Advisory Council for the School of Engineering a Applied Science are to strengthen communication between the School and th other colleges, schools, and divisions of the University as well as between th School and the University's Board of Trustees; to advise on the programs instruction, research, and service in the School and to help interpret these pro grams to the community and the nation; and to stimulate support for the con tinued development of the School and its programs.

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PROGRAMS OF STUDY AND COURSES OF INSTRUCTION

ON THE FOLLOWING PAGES are listed programs of study, curricula, and courses of instruction offered by the School of Engineering and Applied Science.

Students who are not candidates for degrees but who wish to take courses offered by the School should apply for admission to the Division of University Students.

EXPLANATION OF COURSE NUMBERS

Courses numbered from 1 through 199 are planned for undergraduate credit, although certain courses may be taken for graduate credit when arrangements are approved in advance by the instructor and the Dean. Courses numbered 201 to 300 are planned for graduate credit and may in certain instances be taken by qualified undergraduate students. Courses numbered from 301 to 400 are primarily for doctoral students.

SEMESTER HOURS OF CREDIT

The number of semester hours credit given for the satisfactory completion of a course is indicated in parentheses after the name of the course. Thus, a year course giving three hours of credit each semester is marked (3–3), and a semester course giving three hours credit is marked (3). A semester hour consists of the completion of one fifty-minute period of class work or of one laboratory period a week for one semester.

TIME OF COURSE OFFERINGS

Following course descriptions is a parenthetical statement listing the semester for which the course is scheduled to be offered. The term "academic year" is used only with two-semester courses, and indicates that the first half of the course is to be offered in the fall semester and the second half in the spring semester; the term "as arranged" is used for courses which could not be scheduled at the time of printing this catalogue. Offerings for the summer sessions are not designated in this catalogue. Students should consult the *Summer Sessions Catalogue* or *Schedule of Classes* for summer offerings. A *Schedule of Classes* is also published for each fall and spring semester which provides more exact and up-to-date information concerning the time of course offerings.

KEY TO ABBREVIATIONS

The following abbreviations are used in this catalogue for course designation and by students in registering for courses.

Acct	Accounting	Geol	Geology
Ap S	Applied Science	Math	Mathematics
Chem	Chemistry	ME	Mechanical Engineering
CE	Civil Engineering	OR	Operations Research
CS	Computer Science	Phys	Physics
EE	Electrical Engineering	Psyc	Psychology
E Ad	Engineering Administration	Soc	Sociology
ES	Engineering Science	Stat	Statistics
Engl	English	U&RP	Urban and Regional Planning

Applied Science

Interdepartmental offerings.

UNDERGRADUATE COURSES

1–2 Engineering in Modern Society (1–1)

The role of engineering in a technological society, conventional vs. modern engineering, engineering as a profession, problem-solving approach and engineering methods. (Offered every year: academic year—day. 1972–73 and alternate years: academic year—evening)

59 Introductory Analytical Mechanics (4)

Kinematics, statics, and dynamics of a particle, statics and dynamics of systems of particles, kinematics of a rigid body, geometrical and inertial parameters of rigid bodies, statics and dynamics of rigid bodies and beams. Introduction to Lagrangian-Hamiltonian formulation. Prerequisite: Phys 31. Prerequisite or concurrent registration: Ap S 113. (Spring)

113 Engineering Analysis I (3)

Analytical methods appropriate to the solution of engineering problems. Mathematical topics include matrices and linear algebra; ordinary differential equations, vector calculus, and integral theorems; complex algebra. Prerequisite: Math 32. (Fall and spring)

114 Engineering Analysis II (3)

Analytical methods appropriate to the solution of engineering problems. Mathematical topics include Bessel functions, Legendre polynomials, Fourier series and integrals, Laplace transform, partial differential equations and boundary value problems. Prerequisite: Ap S 113. (Fall and spring)

115 Probabilistic and Statistical Methods in Engineering (3)

(Formerly E Ad 115)

Solution of engineering problems using sets and functions; probability models; distributions and functions; statistical concepts and methods, including hypothesis testing, correlation, and regression. Prerequisite: Math 32. (Fall and spring)

GRADUATE COURSES

211 Mathematical Methods in Applied Science I (3)

Introduction to analytic function theory, including contour integration and conformal mapping. Elements of integral transforms with application to boundary value problems. Prerequisite: approval of Department. (Fall and spring)

212 Mathematical Methods in Applied Science II (3)

Introduction to theory of finite and infinite dimensional vector spaces, generalized Fourier series, completeness property. Tensor calculus, curvilinear coordinates. Prerequisite: approval of Department. (Fall)

213 Mathematical Methods in Applied Science III (3)

Classification of second-order linear partial differential equations, characteristics. Solution of boundary value problems associated with various equations of mathematical physics by separation of variables and Green's functions. Prerequisite: Ap S 211 or approval of Department. (Fall and spring)

214 Mathematical Methods in Applied Science IV (3)

Introduction to calculus of variations, Euler-Lagrange equations, variational formulation of boundary value problems and approximate methods of solution. Theory of linear integral equations, including Fredholm and Hilbert-Schmidt theory. Prerequisite: approval of Department. (Spring)

215 Mathematical Methods in Applied Science V (3)

Perturbation methods in engineering: nonlinear ordinary differential equations, topological and classical methods of solution, asymptotic series, boundary layer solutions; nonlinear partial differential equations, boundary layer solutions which include singular initial value and boundary value problems. Prerequisite: approval of Department. (Spring)

KOOLHAAS


Civil,
Mechanical,
and Environmental
Engineering

Civil, Mechanical, and Environmental Engineering*

Professors C.H. Walther, G.M. Arkilic, R.R. Fox, Harold Liebowitz, Freudenthal *(Chairman)*, S.W. Yuan, Warren Mason *(Research)*, W.A. *(Research)*, Joseph Foa, J.E. Feir

Adjunct Professors D.P. Johnson, J.E. Duberg, I.E. Garrick, B.L. Clark, R.J. Seeger

Professorial Lecturers Paul Zilczer, R.E. Fulton, R.R. Hunziker, Robert Wil Joseph Kirshner

Associate Professors John Eftis, B.I. Hyman, A.M. Kiper, T.G. Toridis, J.S Chi *(Research)*, G.H. Koopmann *(Visiting Research)*, C.G. Rice *(Visiting search)*

Associate Professorial Lecturers M.P. Gaus, W.D. Erickson, R.W. Fralich, Kruszewski, Walter Olstad, M.J. Queijo, E.C. Yates, Jr., Shou-Ling W Michael Yachnis, F.Y. Yokel, R.N. Gold, Robert Perry, Nils Salvesen, Reid, T.W. Butler, R.M. Chambers, J.D. Shaughnessy, Jaroslaw Sobi czanski, Manuel Stein, R.H. Tolson

Assistant Professors D.L. Jones *(Research)*, G.K. Lea, J.L. Whitesides, Jr. search), Chao-Mei Chen, Gerhard Schueller, Charles Gilmore, D.E. MacD ald *(Research)*, J.C. Yu *(Research)*, A.M. Bloom *(Research)*

Assistant Professorial Lecturers F.J. Hughes, R.W. Barnwell, J.D. Buck A.R. Saunders, J.A. Gorman, Arthur Sosslau, Benjamin Whang, D.H. La anen, K.J. Perlman, I.E. Beckwith, R.L. Bowles, M.F. Card, J.C. Hard C.J. Jachimowski, H.A. Leybold, H.G. Reichle, Jr., J.B. Robertson, Smith, R.E. Brown, M.B. Barker

Lecturer S.H. Sandler

CIVIL ENGINEERING—UNDERGRADUATE STUDY

Civil engineering encompasses those branches of engineering activities mo closely related to the control and improvement of our environment and of th conditions of life. Study in this field prepares students for careers in the plan ning, design, and construction of buildings; bridges; roads; airports; rapi transportation systems; harbors; off-shore facilities; coastal protection stru tures; flood and pollution control systems for rivers, estuaries, and lakes; inland navigation systems; large power generation and flood control dams; water re sources projects; urban renewal and development projects; and pollution con trol and waste disposal projects. It also provides the scientific and techno logical background required for careers in municipal engineering, urban and regional planning, environmental civil engineering, as well as for careers in engineering research in structural mechanics, ocean engineering, materials engineering, and industrialized housing.

The concern for environmental quality has led to the identification of nu merous problem areas such as air, water, land, and noise pollution, among others, which, in turn, has emphasized the need for "broad-gauged" engineer ing personnel who have been educated in a field of engineering and have a realistic understanding of the social, economic, and legal aspects of their pro fessions. The flexibility in the civil engineering curriculum provided by the relatively large number of technical electives in the senior year allows the stu

* Staff of Instruction for the academic year 1971–72.

dent interested in these contemporary urban problems to emphasize environmental aspects by branching off into an area of environmental civil engineering. The concentration of study outlined in the curriculum below provides the essentials for beginning a career upon graduation, for registration as a professional civil engineer as required by law, and for continuing study at the graduate level. The first four semesters are common to all undergraduate fields in the School; however, a student electing the environmental civil engineering option should select his humanities and social science electives with a view to his interest in environmental engineering (Sociology 126, *Urban Sociology*, must be included as one of his electives).

CURRICULUM

First Semester

Ap S 1:	Engineering in Modern Society (1)
Engl 1 or 1x:	English Composition: Language as Communication (3)
Math 30:	Precalculus (3)
Phys 1:	General Physics (4)
Elective:	Selected from humanities or social sciences (3)

Second Semester

Ap S 2:	Engineering in Modern Society (1)
EE 51:	Applications of Computers (3)
Math 31:	Calculus of One Variable (3)
Phys 2:	Introduction to Modern Physics (4)
Elective:	Selected from humanities or social sciences (3)

Third Semester

Ap S 115:	Probabilistic and Statistical Methods in Engineering (3)
Chem 13:	General Chemistry (4)
Math 32:	Calculus of Several Variables (3)
Phys 31:	Introduction to Theoretical Physics (2)
Phys 51:	Introduction to Experimental Physics (2)
Elective:	Selected from humanities or social sciences (3)

Fourth Semester

Ap S 59:	Introductory Analytical Mechanics (4)
Ap S 113:	Engineering Analysis I (3)
CE 140:	Materials Science (3)
Phys 32:	Introduction to Theoretical Physics (2)
Phys 52:	Introduction to Experimental Physics (2)
Elective:	Selected from humanities or social sciences (3)

Fifth Semester

Ap S 114:	Engineering Analysis II (3)
CE 120:	Introduction to the Mechanics of Solids (4)
CE 123:	Structural Theory (6)
ME 131:	Thermodynamics (3)

Sixth Semester

CE 183:	Urban Planning (3)
CE 190:	Legal and Economic Aspects of Engineering (2)
Geol 136:	Engineering Geology (3)
ME 126:	Fluid Mechanics (3)
Elective:	Selected from humanities or social sciences (6)

Seventh Semester

CE 166:	Materials Engineering (2)
CE 167:	Mechanics of Materials Laboratory (1)
CE 168:	Introductory Soil Mechanics (3)
CE 191:	Metal Structures (3)
CE 193:	Hydraulics and Hydrology (3)
Elective:	Technical electives (6)

Eighth Semester

CE 182:	Foundation Engineering (2)
CE 185:	Soil Mechanics and Foundation Engineering Laboratory (1)
CE 192:	Reinforced Concrete Structures (3)
CE 194:	Environmental Engineering I: Water Supply and Resources (3)
Elective:	Technical electives (8)

*Technical Electives**

CE 186:	Advanced Mechanics of Solids (3)
CE 195:	Urban Transportation Engineering (3)
CE 196:	Failure and Reliability Analysis of Engineering Structures (3)
CE 197:	Environmental Engineering II: Waste and Pollution Control (3)
CE 201:	Design of Metal Structures (3)
CE 202:	Design of Reinforced Concrete Structures (3)
CE 203:	Prestressed Concrete Structures (3)
CE 208:	Rock and Ice Mechanics (3)
CE 210:	Methods of Structural Analysis (3)
CE 212:	Engineering Climatology (3)
CE 213:	Structural Design for Dynamic Loads (3)
CE 215:	Urban Construction Technology (3)
ES 234:	Composite Materials (3)
Geol 125:	Marine Geology (3)
Geol 128:	Geomorphology (3)
Geol 181:	General Oceanography (3)
Geol 188:	Geophysics for Geologists II (3)
ME 120:	Methods of Engineering Experimentation (2)
ME 134:	Dynamics of Linear Systems (3)
U&RP 201:	Introduction to Urban Planning (3)
U&RP 207:	Land Development Planning (3)
U&RP 208:	Urban Transportation Planning (3)

Environmental Civil Engineering Option

Environmental civil engineering is concerned with the study of the problems of environmental quality—air, water, land, noise, transportation, urban renewal, etc.—that affect the life, development, and behavior of the individual as well as society. One of the goals of this program is to provide the student with the

* For Geology and Urban and Regional Planning course descriptions, see the *Undergraduate and Graduate Catalogue*.

essentials for beginning a career upon graduation so that he may be in a position to contribute to the solutions of the problems related to the improvement of environmental quality. The program provides study of a comprehensive cross section of several fields of civil engineering—structures, materials, hydraulics, transportation, waste control—combined with allied fields in urban and regional planning, legal and legislative practices, and the social sciences which emphasize environmental aspects. The curriculum prepares the student for graduate study or for a career in environmental civil engineering.

First Semester

Ap S 1: Engineering in Modern Society (1)
Engl 1 or 1x: English Composition: Language as Communication (3)
Math 30: Precalculus (3)
Phys 1: General Physics (4)
Elective: Selected from humanities or social sciences (3)

Second Semester

Ap S 2: Engineering in Modern Society (1)
EE 51: Applications of Computers (3)
Math 31: Calculus of One Variable (3)
Phys 2: Introduction to Modern Physics (4)
Elective: Selected from humanities or social sciences (3)

Third Semester

Ap S 115: Probabilistic and Statistical Methods in Engineering (3)
Chem 13: General Chemistry (4)
Math 32: Calculus of Several Variables (3)
Phys 31: Introduction to Theoretical Physics (2)
Phys 51: Introduction to Experimental Physics (2)
Elective: Selected from humanities or social sciences (3)

Fourth Semester

Ap S 59: Introductory Analytical Mechanics (4)
Ap S 113: Engineering Analysis I (3)
CE 140: Materials Science (3)
Phys 32: Introduction to Theoretical Physics (2)
Phys 52: Introduction to Experimental Physics (2)
Elective: Selected from humanities or social sciences (3)

Fifth Semester

Ap S 114: Engineering Analysis II (3)
CE 120: Introduction to the Mechanics of Solids (4)
CE 123: Structural Theory (6)
ME 131: Thermodynamics (3)

Sixth Semester

CE 183: Urban Planning (3)
CE 190: Legal and Economic Aspects of Engineering (2)
Geol 136: Engineering Geology (3)
ME 126: Fluid Mechanics (3)
Elective: Selected from humanities or social sciences (6)

Seventh Semester

CE 166:	Materials Engineering (2)
CE 167:	Mechanics of Materials Laboratory (1)
CE 168:	Introductory Soil Mechanics (3)
CE 193:	Hydraulics and Hydrology (3)
CE 195:	Urban Transportation Engineering (3)
CE 197:	Environmental Engineering II: Waste and Pollution Control (
Elective:	Technical elective (3)

Eighth Semester

CE 182:	Foundation Engineering (2)
CE 185:	Soil Mechanics and Foundation Engineering Laboratory (1)
CE 192:	Reinforced Concrete Structures (3)
CE 194:	Environmental Engineering I: Water Supply and Resources (3)
Elective:	Technical electives (8)

*Technical Electives**

B Sc 11–12:	Introductory Biology for Science Majors (4–4)
Chem 50:	Introduction to Organic Chemistry (4)
CE 215:	Urban Construction Technology (3)
Geol 122:	Structural Geology (3)
Geol 125:	Marine Geology (3)
Geol 128:	Geomorphology (3)
Geol 181:	General Oceanography (3)
Geol 241:	Geochemistry (3)
ME 176:	Environmental Engineering Problems (3)
†Soc 126:	Urban Sociology (3)
U&RP 201:	Introduction to Urban Planning (3)
U&RP 207:	Land Development Planning (3)
U&RP 208:	Urban Transportation Planning (3)

COURSES

120 **Introduction to the Mechanics of Solids** (4)

Concepts of stress and strain; strain energy; stress and deformation in slender members due to axial, torsional, and bending loads; introduction to yield criteria and inelastic deformation. Prerequisite: Ap S 59. (Fall)

123 **Structural Theory** (6)

(Formerly CE 121–22 Structural Theory (3–3))

Theory of determinate and indeterminate structures using both classical and modern approaches. Prerequisite or concurrent registration: CE 120. (Fall)

140 **Materials Science** (3)

Electron structure of atoms; atomic and molecular bonding; energy bands; crystal structure; imperfections; noncrystalline solids; reaction rates; diffusion; transport phenomena—thermal conductivity, electrical conduction in semiconductors; magnetism; elasticity and anelastic phenomena; microplasticity; plastic deformation; fracture. Prerequisite or concurrent registration: Ap S 113, Phys 32. (Spring)

* For Biological Sciences, Chemistry, Geology, and Urban and Regional Planning course descriptions, see the *Undergraduate and Graduate Catalogue*.
† Sociology 126 must be included as one of the electives during the first year of study.

166 **Materials Engineering** (2)

Mechanical properties and their description: effect of microstructure on the mechanical behavior of metals, ceramics, polymers, and polyphase materials; effect of strain-rate and temperature; creep, fatigue, and fracture; effect of surface and environment; materials evaluation for structural performance. Prerequisite: CE 120, 140; or approval of Department. (Fall)

167 **Mechanics of Materials Laboratory** (1)

Measurement of strains and forces; determination of elastic, anelastic, and rubber-elastic parameters; observation of microplastic and plastic deformation; plastic instability; creep, creep-instability, and creep-fracture; brittle fracture; fatigue; cyclic state. Prerequisite or concurrent registration: CE 166. (Fall)

168 **Introductory Soil Mechanics** (3)

Engineering properties of soils; analysis of lateral earth pressures, bearing capacity, foundations, and slope stability. Prerequisite: CE 120, ME 126. (Fall)

182 **Foundation Engineering** (2)

Subsurface exploration, design of shallow foundations, design of pile foundations, earth-retaining structures. Prerequisite: CE 168. (Spring)

183 **Urban Planning** (3)

Engineering aspects of urban planning, including transportation, water supply and sewerage, public utilities, safety and convenience, and natural environment. (Spring)

185 **Soil Mechanics and Foundation Engineering Laboratory** (1)

Laboratory experiments for the classification, strength, compressibility, and general engineering properties of soils. Prerequisite: CE 168. (Spring)

186 **Advanced Mechanics of Solids** (3)

Deformation and strain, stress, invariants, constitutive equations. Elastic, viscoelastic, elastic-plastic, and viscoplastic response; technical beam theory; eccentric bending; buckling; torsion. Failure criteria and failure mechanisms. Prerequisite: CE 166, 167. (As arranged)

190 **Legal and Economic Aspects of Engineering** (2)

Laws relating to engineering practice, preparation of contract documents and specifications, consideration of economic factors in engineering design decisions. (Spring)

191 **Metal Structures** (3)

Principles of the design of metal structures; structural elements; connections; specific problems of analysis; methods of construction. (Fall)

192 **Reinforced Concrete Structures** (3)

Principles of the design of reinforced concrete structures. Details of reinforcement of structural elements. Monolithic structures; precast elements; methods of construction. (Spring)

193 **Hydraulics and Hydrology** (3)

Fluid transport in open and closed conduits. Gravity waves; theory of ground water movement; elements of surface hydrology; rainfall and

runoff; groundwater hydrology. Civil engineering and hydrogeologic applications of seepage, drainage, sea water intrusion in coastal area well flow, etc. Statistical hydrology. (Fall)

194 **Environmental Engineering I: Water Supply and Resources** (3)

Planning and design of water supply and waste-water disposal system Water quality control and treatment processes. Desalination; stream p lution control. Prerequisite: CE 193 and senior status. (Spring)

195 **Urban Transportation Engineering** (3)

Relation of transportation to urban planning; transport systems; transpo tation planning and design, including surveys, data analysis, economic and coordination of systems. Prerequisite: senior status. (Fall)

196 **Failure and Reliability Analysis of Engineering Structures** (3)
(Formerly Structural Safety and Reliability)

Operational and structural failure mechanisms: instability, fracture, and fatigue. Operational and structural safety, probability of failure. Aspect of probabilistic structural analysis; statistics of extremes; risk and relia bility; optimal design criteria. Prerequisite: Ap S 115, CE 123; or equiva lent. (Spring)

197 **Environmental Engineering II: Waste and Pollution Control** (3)

Disposal of sewage, biological treatment, chemical treatment, filtration, activated sludge, sludge handling and disposal. Control of industrial wastes and of nuclear waste products. Solid waste disposal. Prerequisite: senior status. (Fall)

198 **Research** (1 to 3)

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

MECHANICAL ENGINEERING—UNDERGRADUATE STUDY

Mechanical engineering is primarily concerned with physical systems in mo tion. A mechanical engineer is concerned with the conversion, transfer, and control of energy from its source to its moving system. He has contributed to our present technology in every industry and in every phase of research, de sign, development, and production. Land and marine vehicles, transportation systems, air-conditioning systems, nuclear reactors and fuel cells, low-pollu tion control devices, and a host of other devices lie in his domain. His train ing should provide him with the ability to formulate problems based on funda mental laws of nature, to recognize the types of methods which are applicable to their solution, to read with understanding the relevant work, and to come up with a usable answer. The mechanical engineering curriculum provides a background for careers in research, design, development, and manufacture in a wide variety of industries.

Course offerings in the field of mechanical engineering, which begin with a broad foundation in physics, chemistry, mathematics, humanities, and social sciences, consist of studies in basic mechanics of solids and fluids, electricity and electronics, material sciences, dynamic analysis, thermal sciences, energy conversion and power, environmental control, and the design of machines and systems and their control. The program of study outlined below is based on the concept that the mechanical engineer must be prepared to meet the chal lenge of ever-increasing technical, economic, and social problems.

Graduates are qualified for professional positions in design, analysis, manufacture, and application of machines, process, and control, or in research and development, as well as for graduate work.

CURRICULUM

First Semester

Ap S 1: Engineering in Modern Society (1)
Engl 1 or 1x: English Composition: Language as Communication (3)
Math 30: Precalculus (3)
Phys 1: General Physics (4)
Elective: Selected from humanities or social sciences (3)

Second Semester

Ap S 2: Engineering in Modern Society (1)
EE 51: Applications of Computers (3)
Math 31: Calculus of One Variable (3)
Phys 2: Introduction to Modern Physics (4)
Elective: Selected from humanities or social sciences (3)

Third Semester

Ap S 115: Probabilistic and Statistical Methods in Engineering (3)
Chem 13: General Chemistry (4)
Math 32: Calculus of Several Variables (3)
Phys 31: Introduction to Theoretical Physics (2)
Phys 51: Introduction to Experimental Physics (2)
Elective: Selected from humanities or social sciences (3)

Fourth Semester

Ap S 59: Introductory Analytical Mechanics (4)
Ap S 113: Engineering Analysis I (3)
CE 140: Materials Science (3)
Phys 32: Introduction to Theoretical Physics (2)
Phys 52: Introduction to Experimental Physics (2)
Elective: Selected from humanities or social sciences (3)

Fifth Semester

Ap S 114: Engineering Analysis II (3)
CE 120: Introduction to the Mechanics of Solids (4)
EE 11: Linear Networks I (3)
ME 131: Thermodynamics (3)
Elective: Selected from humanities or social sciences (3)

Sixth Semester

EE 20: Introductory Engineering Electronics (3)
ME 120: Methods of Engineering Experimentation (2)
ME 126: Fluid Mechanics (3)
ME 134: Dynamics of Linear Systems (3)
ME 148: Thermodynamic Analysis (3)
Elective: Selected from humanities or social sciences (3)

Seventh Semester

CE 166: Materials Engineering (2)
CE 167: Mechanics of Materials Laboratory (1)

ME 155: Compressible Fluid Flow (3)
ME 171: Mechanics of Deformable Solids I (3)
ME 187: Heat Transfer Theory (3)
ME 191: Mechanical Design (3)
Elective: Technical elective (3)

Eighth Semester

EE 172: Control Systems (3)
ME 152: Mechanical Engineering Laboratory (2)
ME 176: Environmental Engineering Problems (3)
ME 193: Engineering Systems Design (3)
ME 194: Energy Conversion (3)
Elective: Technical elective (3)

Technical Electives

CE 197: Environmental Engineering II: Waste and Pollution Control (3)
ME 161: Advanced Dynamics (3)
ME 215: Theory of Vibrations (3)
ME 221: Intermediate Fluid Mechanics (3)
ME 225: Turbomachinery I (3)
ME 237: Propulsion I (3)
ME 240: Kinematic Synthesis (3)
ME 247: Fluidics (3)
ME 251–52: Transportation (3–3)

COURSES

120 Methods of Engineering Experimentation (2)

Engineering reports and presentation of experimental information. Introduction and demonstration of various types of measuring equipment, including strain gages, oscilloscopes, transducers, etc. Laboratory includes introduction to experimental techniques and experiments designed for the purpose of familiarization with basic equipment. Prerequisite: Phys 51, 52. (Spring)

126 Fluid Mechanics (3)

Basic laws of incompressible fluid flow and their application; introduction to boundary layer theory. Prerequisite: Ap S 59. (Spring)

131 Thermodynamics (3)

Fundamental thermodynamic concepts from classical and statistical viewpoints; thermal equilibrium and temperature; the first law of thermodynamics, energy analysis of thermodynamic systems. Approach to equilibrium, entropy and the second law of thermodynamics, analysis of thermodynamic systems. Prerequisite or concurrent registration: Ap S 59. (Fall)

134 Dynamics of Linear Systems (3)

Vibration of single- and multiple-degree of freedom linear systems, transient and steady-state analysis, vibration of distributed parameter systems and solution by numerical methods. Prerequisite: Ap S 59, 114. (Spring)

148 Thermodynamic Analysis (3)

Application of thermodynamics to engineering systems, irreversibility and

availability, thermodynamic potentials and criteria of equilibrium. Analysis of thermodynamic cycles; power and refrigeration cycles, air-standard cycles; nonreactive gas mixtures; thermodynamics of reactive mixtures. Prerequisite: ME 131. (Spring)

152 **Mechanical Engineering Laboratory** (2)

Emphasis on experimental projects involving problem definition, analysis, data acquisition and reduction, and the formal report; design of new experiments or modification of existing experiments in the mechanical, fluid, and thermal areas is encouraged. Prerequisite: ME 120. (As arranged)

155 **Compressible Fluid Flow** (3)

Basic laws of compressible fluid flow, with application to nozzles, pipe flow, and fluid machinery; introduction to thin airfoil theory. Prerequisite: ME 126, 131. (Fall)

161 **Advanced Dynamics** (3)

Review of rigid body dynamics and Euler's equations; balancing of rotating shafts; motion about a fixed point, Euler's angles; spinning top and the theory of the gyroscope; Lagrange's equations for particles, rigid bodies, and systems; introduction to kinematic analysis and synthesis of mechanisms. Prerequisite: ME 134. (Fall)

171 **Mechanics of Deformable Solids I** (3)

Introduction to theory of elasticity. Derivation of basic equations; torsion and pure bending of slender members of arbitrary cross section, membrane analogy; two-dimensional problems; Airy stress function, stress concentrations; minimum energy principles. Prerequisite: CE 120. (Fall)

172 **Mechanics of Deformable Solids II** (3)

Theory of plasticity. Stress and strain deviators; invariants, criteria for yielding; Lode variables; plastic stress-strain relations; stresses in elasto-plastic tubes; twisting of elasto-plastic bars; basic concepts of slip line fields; introduction to creep. Prerequisite: ME 171. (As arranged)

176 **Environmental Engineering Problems** (3)

Kinds and sources of air, thermal, and noise pollution; abatement of pollution. Prerequisite: senior status. (Spring)

187 **Heat Transfer Theory** (3)

Steady- and unsteady-state heat conduction; analytical, analog, and numerical solutions. Convective heat transfer, boundary layer approach, analogy between heat and momentum transfer; thermal radiation, heat transfer by radiation between surfaces; design and selection of heat exchangers. Prerequisite: Ap S 114, ME 126. (Fall)

191 **Mechanical Design** (3)

Introduction to design concept, selection of materials, and strength of mechanical elements; design of machine components such as shafts, springs, bearings, gears, couplings, screws, and related mechanical components. Prerequisite: senior status. (Fall)

193 **Engineering Systems Design** (3)

Principles of creative design and systems design concept; computer-aided

design; design project involving the complete design of a mechanical engineering device. Prerequisite: ME 191. (Spring)

194 **Energy Conversion** (3)

Principles of steady-state energy conversion; basic ideas of quantum physics and introduction to semiconductors; analyses of thermoelectric, photovoltaic, thermionic, and magnetohydrodynamic generators and fuel cells. Prerequisite: EE 20, ME 148. (Spring)

198 **Research** (1 to 3)

Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status. (Fall and spring)

GRADUATE STUDY

Dynamic developments in science and technology in decades to come will require that the engineer keep pace with newly emerging technological disciplines, as well as with new techniques in analysis, design, and computation. Under these circumstances, it is evident that graduate education in advanced technology will assume a vital responsibility in answering the needs of a technologically oriented society. Amidst the proliferation of knowledge and technological specialty, the School adheres to the principle that versatility and depth in scientific fundamentals should be the characteristic features of any graduate program of study that attempts to prepare the graduate student to cope with the engineering developments of today and of the future.

The Department of Civil, Mechanical, and Environmental Engineering offers graduate programs of study in the various areas of concentration in the professional disciplines of civil and mechanical engineering. Its professional as well as basic interdisciplinary programs encompass the broad areas of solid mechanics, structural engineering, geotechnics and foundation engineering, ocean engineering, public works engineering, urban environmental engineering, flight sciences, mechanical engineering design, propulsion, transportation engineering, thermal sciences, material engineering, fluid mechanics, and aerospace engineering. Within these broad categories are basic programs of study and research in the elasticity, inelasticity, and fracture of solids; the mechanics of continua; the structure and properties of materials; the theory of plates, shells, and elastic stability; advanced structural analysis and design, including structural reliability; structural dynamics; soil mechanics; classical and statistical thermodynamics; heat and mass transfer; energy conversion; combustion processes; incompressible, compressible, laminar, viscous, turbulent, hypersonic, and nonsteady flows; hydrodynamics and oceanography; gas dynamics and reaction kinetics; analytical and nonlinear mechanics; advanced dynamics; atmospheric space flight and celestial mechanics; dynamic stability of flight structures; propulsion systems; and aerothermochemistry. As part of the interdisciplinary program, students elect approved courses from other departments of the School of Engineering and Applied Science, as well as from other schools and divisions of the University. Depending upon the interest of the student, some of the programs leading to the degrees of Master of Science and (by special permission of the appropriate department chairman) Doctor of Science are given at the NASA-Langley Research Center, Langley Station, Hampton, Virginia. NASA-Langley's extensive scientific and engineering facilities

nd equipment are utilized whenever feasible. Arrangements can also be made o use the facilities and equipment of the Naval Ship Research and Development Laboratory, Annapolis, Maryland, where an off-campus Master's degree rogram has been initiated.

Each program is arranged to fit the individual needs and interests of the graduate student, and at the same time to utilize effectively his previous experience and background. This background should normally include an undergraduate degree in engineering, the physical sciences, or applied mathematics. Each graduate student is assigned a faculty adviser on the basis of his study nterests, thereby enabling a close student-faculty relationship to develop during the course of his program.

FIELDS AND AREA OF CONCENTRATION

Programs of study in any field of concentration will generally include courses rom appropriate allied areas.

Acoustics*

Ap S 211: Mathematical Methods in Applied Science I
Ap S 213: Mathematical Methods in Applied Science III
Ap S 215: Mathematical Methods in Applied Science V
*ES 270: Introduction to Acoustics
*ES 271: Random Process Theory I
*ES 272: Random Process Theory II
*ES 273: Time Series Analysis
*ES 274: Noise and Vibration Control
*ES 275: Advanced Theoretical Acoustics
*ES 276: Acoustical and Mechanical Measurements
*ES 277: Physical Acoustics
*ES 278: Psychological and Physiological Acoustics
*ES 279: Human Factors in Engineering
*ES 280: Special Topics in Acoustics
ES 298: Research
ES 299–300: Thesis Research
*ES 310: Aeroacoustics
*ES 311: Nonlinear Acoustics
*ES 312: Theory of Random Vibration
ES 398: Advanced Reading and Research
ES 399: Dissertation Research
ME 215: Theory of Vibrations
ME 216: Structural Dynamics
ME 221: Intermediate Fluid Mechanics
ME 312: Theory of Turbulence

Aerospace Engineering*

ES 217: Analytical Mechanics
ES 220: Nonlinear Mechanics
*ES 263: Atmospheric Physics for Engineers
*ES 273: Time Series Analysis
ES 298: Research
ES 299–300: Thesis Research
*ME 248: Seminar: Aircraft Design

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

ME 275:	Stability and Control of Vehicles
*ME 276:	Mechanics of Space Flight
*ME 283:	Advanced Propulsion Systems
*ME 293:	Aerothermochemistry I
*ME 294:	Aerothermochemistry II

Computer-aided Structural Design

Ap S 211:	Mathematical Methods in Applied Science I
Ap S 212:	Mathematical Methods in Applied Science II
Ap S 213:	Mathematical Methods in Applied Science III
CE 252:	General Structural Dynamics
CE 261:	Analysis of Plates and Shells
CE 263:	Theory of Structural Stability
EE 157:	Machine and Assembly Language Programming
ES 221:	Theory of Elasticity I
ES 284:	Numerical Methods in Engineering
ES 285:	Finite-element Methods in Engineering Mechanics
*ES 286:	Analysis and Design of Thin-walled Structures
*ES 287:	Automated Design of Complex Structures
ES 289:	Special Topics in Structural Design
ES 299–300:	Thesis Research
OR 251:	Linear Programming

Flight Sciences*

Ap S 211:	Mathematical Methods in Applied Science I
Ap S 213:	Mathematical Methods in Applied Science III
EE 271:	Automatic Control in State Space Setting
ME 215:	Theory of Vibration
ME 221:	Intermediate Fluid Mechanics
ME 222:	Applied Fluid Dynamics
*ME 270:	Aerodynamics of Flight Vehicles
*ME 271:	Flight Dynamics of V/STOL Aircraft
*ME 272:	Stability and Control of V/STOL Aircraft
*ME 273:	Principles of Automatic Flight Control
*ME 274:	Principles of Flight Guidance
*ME 279:	Special Topics in Flight Sciences
ME 298:	Research
ME 299–300:	Thesis Research

Fluid Mechanics

Ap S 211:	Mathematical Methods in Applied Science I
Ap S 212:	Mathematical Methods in Applied Science II
Ap S 213:	Mathematical Methods in Applied Science III
Ap S 214:	Mathematical Methods in Applied Science IV
Ap S 215:	Mathematical Methods in Applied Science V
CE 212:	Engineering Climatology
CE 274:	Mechanics of Water Waves
CE 275:	Special Topics in Ocean Engineering
EE 133:	Electromagnetic Waves
EE 236:	Magnetohydrodynamics
ES 228:	Physical Oceanography
ME 218:	Design of Floating and Submerged Marine Vehicles
ME 221:	Intermediate Fluid Mechanics
ME 222:	Applied Fluid Dynamics

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

ME 223: Aeroelasticity
ME 227: Viscous Flow
ME 231: Hydrodynamics
ME 235: Compressible Flow
ME 285: Reaction Kinetics
ME 288: Convective Heat and Mass Transfer
ME 289: Radiative Heat Transfer
ME 297: Special Topics in Fluid Mechanics
ME 298: Research
ME 299–300: Thesis Research
ME 310: Mechanics of Non-Newtonian Fluids
ME 311: Nonsteady Flow
ME 315: Hypersonic Flow
ME 317: Physical Gas Dynamics
ME 398: Advanced Reading and Research
ME 399: Dissertation Research

Geotechnics and Foundation Engineering

Ap S 211: Mathematical Methods in Applied Science I
Ap S 213: Mathematical Methods in Applied Science III
CE 204: Applied Soil Mechanics I
CE 205: Applied Soil Mechanics II
CE 206: Foundation Engineering
CE 207: Special Topics in Soil Mechanics
CE 208: Rock and Ice Mechanics
CE 209: Theoretical Soil Mechanics
CE 217: Water Resources Engineering I
CE 218: Water Resources Engineering II
CE 257: Harbor and Coastal Engineering I
CE 298: Research
CE 299–300: Thesis Research
CE 398: Advanced Reading and Research
CE 399: Dissertation Research
ES 221: Theory of Elasticity I
ES 256: Introduction to the Theories of Inelastic Media
ES 285: Finite-element Methods in Engineering Mechanics
*Geol 122: Structural Geology
*Geol 128: Geomorphology
*Geol 147: Chemical Geology in the Earth and Ocean Sciences
*Geol 163: Sedimentation
*Geol 187: Geophysics for Geologists I
*Geol 188: Geophysics for Geologists II
*Geol 224: Advanced Structural Geology
ME 221: Intermediate Fluid Mechanics

Mechanical Engineering Design

CS 284: Applications of Numerical Methods
ME 161: Advanced Dynamics
ME 218: Design of Floating and Submerged Marine Vehicles
ME 221: Intermediate Fluid Mechanics
ME 225: Turbomachinery I
ME 226: Turbomachinery II

*For Geology course descriptions, see the *Undergraduate and Graduate Catalogue*.

ME 240:	Kinematic Synthesis
ME 241:	Engineering Systems Design
ME 243:	Advanced Mechanical Engineering Design
ME 246:	Electromechanical Control Systems
ME 247:	Fluidics
ME 250:	Design of Complex Systems
ME 251–52:	Transportation
ME 253:	Vehicular Performance
ME 298:	Research
ME 299–300:	Thesis Research

Ocean Engineering

Ap S 211:	Mathematical Methods in Applied Science I
Ap S 213:	Mathematical Methods in Applied Science III
Ap S 214:	Mathematical Methods in Applied Science IV
CE 203:	Prestressed Concrete Structures
CE 206:	Foundation Engineering
CE 207:	Special Topics in Soil Mechanics
CE 208:	Rock and Ice Mechanics
CE 217:	Water Resources Engineering I
CE 218:	Water Resources Engineering II
CE 256:	Introduction to Ocean and Coastal Engineering
CE 257:	Harbor and Coastal Engineering I
CE 258:	Harbor and Coastal Engineering II
CE 274:	Mechanics of Water Waves
CE 275:	Special Topics in Ocean Engineering
CE 298:	Research
CE 299–300:	Thesis Research
CE 398:	Advanced Reading and Research
CE 399:	Dissertation Research
ES 228:	Physical Oceanography
*Geol 147:	Chemical Geology in the Earth and Ocean Sciences
*Geol 181:	General Oceanography
*Geol 241:	Geochemistry
*Geol 282:	Oceanography
ME 218:	Design of Floating and Submerged Marine Vehicles
ME 221:	Intermediate Fluid Mechanics
ME 227:	Viscous Flow
ME 237:	Propulsion I
ME 250:	Design of Complex Systems

Propulsion

Ap S 211:	Mathematical Methods in Applied Science I
Ap S 213:	Mathematical Methods in Applied Science III
Ap S 215:	Mathematical Methods in Applied Science V
EE 133:	Electromagnetic Waves
EE 236:	Magnetohydrodynamics
ME 218:	Design of Floating and Submerged Marine Vehicles
ME 221:	Intermediate Fluid Mechanics
ME 225:	Turbomachinery I
ME 226:	Turbomachinery II
ME 227:	Viscous Flow
ME 235:	Compressible Flow

* For Geology course descriptions, see the *Undergraduate and Graduate Catalogue*.

ME 237: Propulsion I
ME 238: Propulsion II
ME 281: Nonequilibrium Thermodynamics
ME 284: Combustion Processes
ME 285: Reaction Kinetics
ME 287: Heat Conduction
ME 288: Convective Heat and Mass Transfer
ME 291: Energy Conversion
ME 298: Research
E 299–300: Thesis Research
ME 311: Nonsteady Flow
ME 398: Advanced Reading and Research
ME 399: Dissertation Research

ic Works Engineering

CE 201: Design of Metal Structures
CE 202: Design of Reinforced Concrete Structures
CE 203: Prestressed Concrete Structures
CE 206: Foundation Engineering
CE 208: Rock and Ice Mechanics
CE 211: Engineering Aspects of Waste Control
CE 212: Engineering Climatology
CE 215: Urban Construction Technology
CE 217: Water Resources Engineering I
CE 218: Water Resources Engineering II
CE 220: Transportation Engineering
CE 221: Pavement and Runway Design
CE 256: Introduction to Ocean and Coastal Engineering
CE 257: Harbor and Coastal Engineering I
CE 298: Research
CE 299–300: Thesis Research
E Ad 204: Administration of Engineering Contracts
E Ad 210: Engineering Law
E Ad 241: Construction Management I
E Ad 242: Construction Management II
E Ad 243: Construction Management III
E Ad 261: Economic Analysis in Engineering Planning

olid Mechanics and Materials Engineering

Ap S 211: Mathematical Methods in Applied Science I
Ap S 212: Mathematical Methods in Applied Science II
Ap S 213: Mathematical Methods in Applied Science III
Ap S 214: Mathematical Methods in Applied Science IV
Ap S 215: Mathematical Methods in Applied Science V
CE 208: Rock and Ice Mechanics
CE 209: Theoretical Soil Mechanics
CE 252: General Structural Dynamics
ES 217: Analytical Mechanics
ES 221: Theory of Elasticity I
ES 222: Theory of Elasticity II
ES 232: Advanced Materials Science
ES 234: Composite Materials
ES 235: Physical Metallurgy
ES 236: Wave Propagation in Solids

ES 240:	Fracture Mechanics
ES 256:	Introduction to the Theories of Inelastic Media
ES 259:	Nonlinear Mechanics of Continua
ES 285:	Finite-element Methods in Engineering Mechanics
ES 290:	Special Topics in Nonlinear Mechanics of Continua
ES 298:	Research
ES 299–300:	Thesis Research
ES 398:	Advanced Reading and Research
ES 399:	Dissertation Research
ME 221:	Intermediate Fluid Mechanics
ME 280:	Advanced Thermodynamics
ME 281:	Nonequilibrium Thermodynamics

Structural Engineering

Ap S 213:	Mathematical Methods in Applied Science III
Ap S 214:	Mathematical Methods in Applied Science IV
CE 201:	Design of Metal Structures
CE 202:	Design of Reinforced Concrete Structures
CE 203:	Prestressed Concrete Structures
CE 206:	Foundation Engineering
CE 210:	Methods of Structural Analysis
CE 213:	Structural Design for Dynamic Loads
CE 215:	Urban Construction Technology
CE 252:	General Structural Dynamics
CE 254:	Special Topics in Structural Mechanics
CE 257:	Harbor and Coastal Engineering I
CE 258:	Harbor and Coastal Engineering II
CE 261:	Analysis of Plates and Shells
CE 262:	Design of Plate and Shell Structures
CE 263:	Theory of Structural Stability
CE 298:	Research
CE 299–300:	Thesis Research
CE 398:	Advanced Reading and Research
CE 399:	Dissertation Research
ES 221:	Theory of Elasticity I
ES 234:	Composite Materials
ES 240:	Fracture Mechanics
ES 285:	Finite-element Methods in Engineering Mechanics

Thermal Sciences

Ap S 211:	Mathematical Methods in Applied Science I
Ap S 212:	Mathematical Methods in Applied Science II
Ap S 213:	Mathematical Methods in Applied Science III
Ap S 214:	Mathematical Methods in Applied Science IV
Ap S 215:	Mathematical Methods in Applied Science V
ME 221:	Intermediate Fluid Mechanics
ME 227:	Viscous Flow
ME 280:	Advanced Thermodynamics
ME 281:	Nonequilibrium Thermodynamics
ME 284:	Combustion Processes
ME 285:	Reaction Kinetics
ME 287:	Heat Conduction
ME 288:	Convective Heat and Mass Transfer
ME 289:	Radiative Heat Transfer
ME 291–92:	Energy Conversion

ME 295: Statistical Thermodynamics
ME 296: Special Topics in Heat and Mass Transfer
ME 298: Research
299–300: Thesis Research
ME 398: Advanced Reading and Research
ME 399: Dissertation Research

nsportation Engineering

TION I: TECHNOLOGY OF THE VEHICLE

CE 201: Design of Metal Structures
CE 210: Methods of Structural Analysis
CE 220: Transportation Engineering
CE 252: General Structural Dynamics
CE 261: Analysis of Plates and Shells
CE 263: Theory of Structural Stability
ME 215: Theory of Vibrations
ME 218: Design of Floating and Submerged Marine Vehicles
ME 222: Applied Fluid Dynamics
ME 223: Aeroelasticity
ME 225: Turbomachinery I
ME 226: Turbomachinery II
ME 237: Propulsion I
ME 238: Propulsion II
ME 241: Engineering Systems Design
ME 243: Advanced Mechanical Engineering Design
ME 246: Electromechanical Control Systems
ME 250: Design of Complex Systems
E 251–52: Transportation
ME 253: Vehicular Performance
ME 275: Stability and Control of Vehicles
ME 298: Research
E 299–300: Thesis Research
ME 398: Advanced Reading and Research
ME 399: Dissertation Research
U&RP 208: Urban Transportation Planning
U&RP 209: Urban Transportation Models

TION II: THE WAY (ROUTE STRUCTURES AND FACILITIES)

CE 201: Design of Metal Structures
CE 202: Design of Reinforced Concrete Structures
CE 203: Prestressed Concrete Structures
CE 204: Applied Soil Mechanics I
CE 205: Applied Soil Mechanics II
CE 206: Foundation Engineering
CE 207: Special Topics in Soil Mechanics
CE 209: Theoretical Soil Mechanics
CE 210: Methods of Structural Analysis
CE 220: Transportation Engineering
CE 221: Pavement and Runway Design
CE 222: Stations and Terminals
CE 223: Traffic Engineering

For Urban and Regional Planning course descriptions, see the *Undergraduate and Graduate Cata-*
log.

CE 252: General Structural Dynamics
CE 257: Harbor and Coastal Engineering I
CE 258: Harbor and Coastal Engineering II
ME 250: Design of Complex Systems
ME 251–52: Transportation
ME 298: Research
ME 299–300: Thesis Research
ME 398: Advanced Reading and Research
ME 399: Dissertation Research
OR 231: Theory of Traffic Flow
*U&RP 208: Urban Transportation Planning
*U&RP 209: Urban Transportation Models

OPTION III: TRANSPORTATION SYSTEMS

CE 220: Transportation Engineering
CE 223: Traffic Engineering
E Ad 281–82: Systems Analysis and Management
†Law 349: Local Government Law
†Law 372: Administrative Law
†Law 407: Seminar: Regulation of Transportation I
†Law 408: Seminar: Regulation of Transportation II
†Law 492: Seminar: Science and the Legal Process
†Law 501: Land Development Law
†Law 505: Intergovernmental Relations I
†Law 506: Intergovernmental Relations II
ME 251–52: Transportation
ME 298: Research
ME 299–300: Thesis Research
ME 398: Advanced Reading and Research
ME 399: Dissertation Research
OR 201: Survey of Operations Research Methods I
OR 231: Theory of Traffic Flow
OR 251: Linear Programming
OR 252: Nonlinear and Dynamic Programming
OR 273: Digital Systems Simulation
OR 277: Queuing Theory
*U&RP 201: Introduction to Urban Planning
*U&RP 208: Urban Transportation Planning
*U&RP 209: Urban Transportation Models
*U&RP 210: Urban Development Economics

Urban Environmental Engineering

CE 201: Design of Metal Structures
CE 202: Design of Reinforced Concrete Structures
CE 203: Prestressed Concrete Structures
CE 204: Applied Soil Mechanics I
CE 206: Foundation Engineering
CE 211: Engineering Aspects of Waste Control
CE 215: Urban Construction Technology
CE 217: Water Resources Engineering I
CE 218: Water Resources Engineering II
CE 220: Transportation Engineering
CE 223: Traffic Engineering

* For Urban and Regional Planning course descriptions, see the *Undergraduate and Graduate Cata-logue*.
† For Law course descriptions, see the *National Law Center* catalogue.

CE 298: Research
299–300: Thesis Research
Ad 204: Administration of Engineering Contracts
Ad 207: The Personnel Function for Engineering Administrators
Ad 210: Engineering Law
Ad 261: Economic Analysis in Engineering Planning
ME 250: Design of Complex Systems
251–52: Transportation
ME 255: Urban Transportation Technologies
ME 261: Fundamentals of Environmental Control
ME 262: Air Pollution Meteorology
ME 263: Air Pollution Control Processes
&RP 204: Urban Development Planning
&RP 205: Urban Housing
&RP 207: Land Development Planning
&RP 208: Urban Transportation Planning

L ENGINEERING COURSES

201 **Design of Metal Structures** (3)

Structural behavior and failure of metal structures; conception and design of structural systems for various cases, including low- and high-rise buildings, long-span structures, bridges, suspended roofs, and special structures. Prerequisite: approval of Department. (Fall)

202 **Design of Reinforced Concrete Structures** (3)

Modes of failure of reinforced concrete structures; selection of appropriate structural system; design of slabs, frames, folded plate roofs, shell structures, and other special structures. Prerequisite: approval of Department. (Fall)

203 **Prestressed Concrete Structures** (3)

Structural behavior and failure modes of prestressed concrete structures; design in prestressed concrete, including long-span structures, bridges, and precast systems. Prerequisite: approval of Department. (Spring)

204 **Applied Soil Mechanics I** (3)

Theories of soil strength; bearing capacity of shallow foundations and their design; deep foundations, including pile types and design criteria; theories of lateral earth pressure with applications; stability analyses of slopes. Selected experiments in the soil mechanics laboratory. Prerequisite: approval of Department. (Spring)

205 **Applied Soil Mechanics II** (3)

Nature of soil, including geological and pedological aspects; flow of water in soil; seepage involving foundations, dams, and wells; stress distribution in earth masses; one- and three-dimensional theories of consolidation; analysis of settlement. Selected experiments in the soil mechanics laboratory. Prerequisite: approval of Department. (Fall)

206 **Foundation Engineering** (3)

Principles of soil mechanics and structural mechanics applied to the analysis and design of spread footings and mat foundations, pile founda-

e Urban and Regional Planning course descriptions, see the *Undergraduate and Graduate Cate-*

tions, retaining structures, including sheeting and bracing systems, an waterfront structures. Problems associated with subsurface explorations dewatering excavations, and underpinning. Prerequisite: approval of De partment. (Spring)

207 **Special Topics in Soil Mechanics** (3)

Selected topics in soil mechanics of current interest, such as soil rheology soil dynamics, computer applications, excavation with nuclear explosives and ocean bottom sediments. May be repeated for credit. Prerequisite approval of Department. (Fall)

208 **Rock and Ice Mechanics** (3)

(Formerly Rock Mechanics)

Classification, composition, and structure of rocks; elastic and rheological properties; fracture; effect of hydrostatic pressure and temperature; effect of water; strain measurement and testing. Classification, composition, and structure of ice; deformation flow and fracture. Engineering, geophysical, and geological applications. Prerequisite: ES 221 or equivalent. (Spring)

209 **Theoretical Soil Mechanics** (3)

Mechanics of continua and their relation to and application in soil mechanics; theories of failure and stability; theories of consolidation; problems of seepage. Prerequisite: CE 204. (Fall)

210 **Methods of Structural Analysis** (3)

Classical and modern methods of analysis of statically indeterminate structures, including matrix analysis, variational methods, finite elements, theory of plastic collapse and shakedown. Prerequisite: graduate status (Fall)

211 **Engineering Aspects of Waste Control** (3)

Hydraulics and design of sewer systems; sewage treatment and sewage disposal; control of industrial and nuclear wastes; biological, chemical, and related physical processes. (Fall)

212 **Engineering Climatology** (3)

Constitution of physical properties of earth and atmosphere, stability conditions, energy balance characteristics, atmospheric motions, storm forecasting models, tree-ring analysis, evaporation, precipitation and fog formation, soil moisture and ground frost. Prerequisite: approval of Department. (Spring)

213 **Structural Design for Dynamic Loads** (3)

Design of structures for dynamic and impact forces; wind loads, wave forces, earthquake and blast loads; design of structural elements in concrete and steel; details of connections; discussion of specific problems. Prerequisite: approval of Department. (Spring)

215 **Urban Construction Technology** (3)

Modern designs and construction techniques for the city; modular construction; construction management and planning. Prerequisite: approval of Department. (Spring)

217 **Water Resources Engineering I** (3)

(CE 217 and 218 replace former CE 214 (3))

Hydrology; open channel flow with application to navigation, irrigation, water power; water supply and distribution. (Fall)

218 **Water Resources Engineering II** (3)
(CE 217 and 218 replace former CE 214 (3))
Groundwater; pollution and sanitation in sewers, lakes, estuaries; water resources planning; special problems. (Spring)

220 **Transportation Engineering** (3)
Elements of transportation technology: mass transportation systems, airports, highways, inland waterways. Problems of design and construction. Prerequisite: approval of Department. (Spring)

221 **Pavement and Runway Design** (3)
Pavement types, wheel-load characteristics; stresses in pavements and subgrades based on elastic and viscoelastic theories; empirical methods of design of flexible and rigid highway and airfield pavements; general principles of runway design. Prerequisite: CE 204, ES 221. (As arranged)

222 **Stations and Terminals** (3)
Unified treatment of the functions and operation of stations and terminals of transportation systems; emphasis on specifications and planning criteria applicable to most existing and foreseeable modes. Problems of locating the facility, planning it as a subsystem of the transportation system, passenger and freight handling, intra-modal and inter-modal interfacing, communication and control. Illustrations include railroad and subway stations, bus terminals, airports, and harbors. Prerequisite: approval of Department. (As arranged)

223 **Traffic Engineering** (3)
Problems of traffic forecasting and planning for the various modes of transportation. Impact on and interaction with urban planning. Prerequisite: Ap S 115 or equivalent and approval of Department. (Fall)

252 **General Structural Dynamics** (3)
Analysis of elastic structures under dynamic loadings—steady-state, transient, and stochastic; vibrations of rigid frames, plates, and thin shells. Stochastic load processes—wind, earthquake, sea; failure under stochastic loading—first exceedance, damage accumulation. Prerequisite: approval of Department. (Fall)

254 **Special Topics in Structural Mechanics** (3)
Selected problems in structural mechanics, including finite element techniques, thermal stresses in one- and two-dimensional structures, impact of elastic bodies, and other current topics of interest. Prerequisite: CE 210 or approval of Department. (As arranged)

256 **Introduction to Ocean and Coastal Engineering** (3)
Application of wave mechanics to the analysis of wave motion in coastal and offshore regions: reflection, diffraction, refraction. Wave spectra: procurement of spectral data by direct measurement or from hind-casting techniques. Beaches and littoral drift, mixing processes, outfalls and intakes in the oceans and estuaries, outfall and intake design, wave forces on coastal and offshore structures, harbor oscillations, tides in estuaries. Prerequisite: Ap S 115, ME 221; or equivalent. (Spring)

257 **Harbor and Coastal Engineering I** (3)
(This course, together with CE 258 Harbor and Coaastal Engineering II (3), replaces former CE 258 Design of Fixed Maritime Structures (3))
Waves and swells, tides and currents, coastal regime, estuaries and deltas,

structures for coastal protection, principles of harbor navigation, harb planning and harbor design, breakwaters and sea walls, quays, dock internal access structures; maintenance of external and internal acce dredging. Prerequisite: CE 256, ES 228. (Fall)

258 **Harbor and Coastal Engineering II** (3)

(This course, together with CE 257 Harbor and Coastal Engineering (3), replaces former CE 258 Design of Fixed Martime Structures (3))

Interaction between structures and waves. Analysis and design of flexi structures: piers, jetties, and protective structures; off-shore drilling pla forms. Design criteria, moorings and cables, harbor operations equip ment. Prerequisite: CE 257; and CE 252 or equivalent. (Spring)

261 **Analysis of Plates and Shells** (3)

Bending and stretching of thin elastic plates under loading with variou boundary conditions, continuous plates and plates on elastic foundation theory of folded plate structures. Theory of curved surfaces; genera linear bending theory and its simplification to membrane theory; bend ing stresses in shells of revolution, shallow shell theory. Specific appli cations. Prerequisite: approval of Department. (Fall)

262 **Design of Plate and Shell Structures** (3)

Design of long-span plate and shell roof structures in reinforced concre and metal; design of containers for fluids and granular materials; com puter applications in the analysis of such structures. Prerequisite: CE 261 or equivalent. (Spring)

263 **Theory of Structural Stability** (3)

General criteria for stability; buckling of elastic and inelastic columns an frames; torsional and lateral buckling; variational methods. Buckling o plates and shells under static loads, stability of stiffened structures, effec of imperfections and boundary conditions. Prerequisite: approval of De partment. (Spring)

274 **Mechanics of Water Waves** (3)

Basic concepts. Infinitesimal waves: irrotational theory for deep- and shallow-water waves, reflexion, refraction, diffraction, attenuation. Water waves of finite amplitude: airy nonlinear shallow-water theory, tides, bores long-waves theory, conoidal and solitary waves, kinematic waves, mass transport. Wave generation by wind: resonance, shear-flow, and masse mechanisms; state-of-the-art based on correlation between theory and measurements. Interfacial (internal) waves. Wave-breaking and reflexion. Prerequisite: ME 221 or equivalent. (Fall)

275 **Special Topics in Ocean Engineering** (3)

Advanced problems in physical oceanography and hydromechanics. Tides and ocean waves, oceanography of estuaries and deltas, currents and coastal regimes, wind waves in coastal waters, wave diffraction and re flection, clapotis, ocean pollution control, ice forces. Prerequisite: ES 228. May be repeated for credit. (As arranged)

298 **Research** (arr.) (Fall and spring)

Basic research projects, as arranged. May be repeated for credit.

299–300 **Thesis Research** (3–3)
(Fall and spring)

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)
Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)

MECHANICAL ENGINEERING COURSES

201 **Mechanical Measurement** (3)
(Formerly MeaS 121)
Precise measurements of mass and length; mechanical and interferometric methods. Prerequisite: approval of Department. (Fall—evening)

202 **Heat Measurement** (3)
(Formerly MeaS 122)
Temperature scales; measurement by resistance thermometry, thermocouples, pyrometry, vapor pressure thermometry; heat transfer quantities and their measurement: calorimeters, flow calorimeters. Prerequisite: approval of Department. (Fall—evening)

203 **Pressure Measurement** (3)
(Formerly MeaS 123)
Experimental techniques for quantitative measurement of pressure; working gages, standards, calibration procedures; methods and apparatus for observations near atmospheric pressure, in the high pressure range and in the vacuum range. Prerequisite: approval of Department. (Spring—evening)

215 **Theory of Vibrations** (3)
Damped and undamped natural vibrations, transient response and response to harmonic and periodic excitation, natural vibration of discrete and continuous systems; integral formulation of eigenvalue problems, response by modal analysis, approximate methods, influence of secondary effects and constraints, damped systems. Prerequisite: approval of Department. (Fall)

216 **Structural Dynamics** (3)
Linear structures with single degree of freedom and with many degrees of freedom; linear continuous structures, nonlinear structures, self-excited vibration, damping mechanisms. Prerequisite: ME 215. (As arranged)

218 **Design of Floating and Submerged Marine Vehicles** (3)
Consideration of interaction between hydrodynamics, propulsion, and configuration aspects of design of floating structures and vehicles; effects of submergence and deep submergence; hydrofoil and vertical jet action; structural considerations. Prerequisite: ES 228. (Spring)

221 **Intermediate Fluid Mechanics** (3)
The continuum, kinematics of fluids: stress tensor, strain and rate-of-strain tensor; fundamental equations of the flow of viscous compressible fluids;

Laplace's equations; source, sink, and doublet; vortices, Biot-Savart t rem and the flow field of a vortex; spherical and cylindrical harmo methods of singularity distributions, complex-variable methods; lam flow of viscous incompressible fluids; boundary layer concept. Prere site: approval of Department. (Fall)

222 Applied Fluid Dynamics (3)

Subsonic lifting line wing theory, direct and inverse solution of the lift surface theory; singularity method for wing-body combination; vo lift theory; effects of camber and twist distribution; transonic airfo effect of wing sweep, area ruling concept; supersonic linearized wing t ory; similarity rules. Prerequisite: ME 221 or equivalent. (Spring

223 Aeroelasticity (3)

Introduction to aeroelastic phenomena; structural deformations of vehi under static and dynamic loads; vibrations of vehicle structures; sta aeroelastic problems (structural deformation, divergence, control effectiv ness, and reversal); flutter theory and calculation of flutter boundar aerodynamics of steady and nonsteady two-dimensional wings in su sonic, sonic, and supersonic flow; strip theory applications of two-dime sional aerodynamics to three-dimensional lifting surfaces; piston theo and Newtonian-flow theory. Prerequisite: ME 215, 221; or equivalen (Fall)

225 Turbomachinery I (3)

Review of thermodynamic principles; fundamentals of fluid flow; hydrau lic power systems; steam and gas turbine cycles; turbine, compressor, an pump types; energy interchange in fluid machinery; design and characteris tics of turbines, compressors, and pumps; linking of compressor and com pressor turbine characteristics; combustion systems; regenerators. Pre requisite: approval of Department. (Fall)

226 Turbomachinery II (3)

Aerodynamics of aerofoils; flow in cascades; data for turbine calcula tions; axial turbine aerodynamic design; performance of compressor cas cades; axial compressor aerodynamic design. Heat and mass transfer with chemical reaction; combustion of liquid fuels; combustion in pre-mixed gases; combustion without pre-mixing; gas-turbine combustion chamber design. Prerequisite: ME 225. (Spring)

227 Viscous Flow (3)

Exact solutions of Navier-Stokes equations; the small Reynolds numbe approximations, laminar boundary layer theory and the techniques for its solution, stability of laminar flows; Reynolds theory of turbulent stresses, applications to internal and external flows, turbulent boundary layer the ory; applications to heat transfer problems; flow separation. Prerequisite: Ap S 213; ME 221 or equivalent. (Fall)

231 Hydrodynamics (3)

Flow at large Reynolds number: vorticity dynamics, Kelvin's theorem in inviscid flow, vorticity in motions generated from rest, boundary layers, applications of the momentum theorem. Irrotational flow theory: appli cations of Bernoulli and momentum theorems to steady flows, flow due to a rigid body, two-dimensional motion and applications of complex variable theory, free surface flows, Froude numbers, criterion of dynamic similar ity. Effectively inviscid flow with vorticity: sheet vortex, flow with swirl, vortex system of a wing. Prerequisite: ME 221. (Spring)

235 **Compressible Flow (3)**

Thermodynamics and physical properties of gases, fundamental equations of a compressible inviscid fluid, small perturbation theory, expansions in Mach number and thickness parameters, second-order shock shapes, role of entropy in supersonic flow, shock wave interactions, hodograph transformation, Kármán-Tsien and other model gases, conical flows, transonic flow theory, method of characteristics, rotational nonisentropic flows. Prerequisite: Ap S 213; ME 221 or equivalent. (Spring)

237 **Propulsion I (3)**

Basic concepts of propulsion: energy transformations in propulsive flows; gas dynamics of combustion, detonation processes; nonuniform flows, mixing; intakes, additive drag; mechanics of flow induction; drag and thrust generation; multiple-flow thrust generators; thrust recovery and augmentation; the propulsion spectrum. Illustrative examples will include propellers, turbojets, turbofans, ramjets, and rockets. Prerequisite: approval of Department. (Spring)

238 **Propulsion II (3)**

Advanced propulsion concepts: nonsteady flows with viscosity, heat exchanges, and entropy gradients; discontinuities and interactions in nonsteady flow; gas dynamics of nonsteady combustion; static, dynamic, and cryptosteady pressure exchange; energy equalizers and dividers; nonsteady-flow thrust generators. Topics for discussion will include a variety of new flow induction and propulsion concepts. Prerequisite: ME 237. (Fall)

240 **Kinematic Synthesis (3)**

Determination of linkage proportions from prescribed input-output conditions for both path and function-generating mechanisms; critical comparison of graphical, analytical, and computer-oriented methods. Techniques are applied to the synthesis of various machines and computers. Prerequisite: approval of Department. (Spring)

241 **Engineering Systems Design (3)**

Principles of system design; interdisciplinary system simulation for mechancial, electrical, fluid, and thermal sciences; dynamic response of systems; mathematical model and analogy studies; optimization techniques with computer-aided solutions. Prerequisite: approval of Department. (Fall)

243 **Advanced Mechanical Engineering Design (3)**

Design of mechanical engineering systems, components, and equipment; requires the integration of engineering disciplines at an advanced level. Prerequisite: approval of Department. (Fall)

246 **Electromechanical Control Systems (3)**

System synthesis, compensation, and stabilization using Bode diagrams, root locus, etc.; linear and nonlinear characterization of mechanical, electromechanical, and electronic control components. Prerequisite: approval of Department. (Fall)

247 **Fluidics (3)**

Introduction of fluidic components and systems: behavior and modeling of bistable and proportional jet devices, vortex amplifiers and sensors,

passive elements, transmission lines; system synthesis, coupling effe Survey of current applications and research. Prerequisite: approval Department. (Spring)

*248 **Seminar: Aircraft Design** (3)

Problem of designing an aircraft to certain specifications. Regulatory straints and requirements, state-of-the-art limitations, computer-aided sign, integration of aircraft components, economic considerations, iterations to final configuration to obtain specified mission profile. Pr requisite: approval of Department.

250 **Design of Complex Systems** (3)
(Formerly ME 260)

Discussion of frontier problems such as salt water conversion, transporta tion devices and systems, systems for space and underwater exploration Determination of specifications for these systems to meet given need Critical discussion of possible solutions based on technical as well as eco nomic and social considerations. Prerequisite: approval of Departmen (Spring)

251–52 **Transportation** (3–3)

A "workshop" for the study of the problems of urban and interurban transportation; identification of the problems of mass transportation and assessment of alternative solutions. Topics for discussion include the nontechnological requirements and constraints of mass transportation and the technological problems of power supply, propulsion, support and suspension, guidance and control, guideways and stations. Prerequisite: approval of Department. (Academic year)

253 **Vehicular Performance** (3)

Methods of performance analysis and evaluation; steady, quasi-steady, and unsteady paths over a flat earth; flight vehicle trajectories over a spherical and rotating earth; optimization of schedules and trajectories. Applications to water, land, air, and space vehicles. Prerequisite: approval of Department. (As arranged)

255 **Urban Transportation Technologies** (3)

Systems aspects; modes of propulsion, thrust and power required, energy storage devices; new concepts; steering and tracking, communication and control, suspension and ride comfort, noise, air pollution, human factors; guideways; evaluation of hypothetical new concepts. Prerequisite: approval of Department. (Fall)

261 **Fundamentals of Environmental Control** (3)

Sources of atmospheric pollutants; diffusion, distribution, effect, and measurements of pollutants; control methods. Limnology, response of natural water to organic and inorganic pollution, analysis of stream and estuarine water quality. Prerequisite: approval of Department. (Fall)

262 **Air Pollution Meteorology** (3)

Weather and motion systems of the atmosphere; ground-level and upper-air conditions; atmospheric stability and inversions; atmospheric turbulence and diffusion; meteorological factors in plant location, design, and operation, and in urban planning. Prerequisite: ME 221 or equivalent (As arranged)

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

263 **Air Pollution Control Processes** (3)

Control of particulate and gaseous emissions; settling, filtration, inertial separation; scrubbing; and chemical, physical, and electrostatic precipitation. Design, operation, and current status of air-pollution control processes. Prerequisite: approval of Department. (As arranged)

*270 **Aerodynamics of Flight Vehicles** (3)

Aerodynamic loads on flight vehicles, interference effects, application of aerodynamic theory to aircraft design, studies of aircraft dynamics and performance. Prerequisite: ME 222 or equivalent. (Spring)

*271 **Flight Dynamics of V/STOL Aircraft** (3)

Various configurations of V/STOL aircraft, review of airscrew theory and rotating wing mechanics, dynamics of rotating wing systems, aeroelasticity of rotor blades and analysis of vibrating modes, performance of V/STOL aircraft. Prerequisite: ES 217 or equivalent. (Spring)

*272 **Stability and Control of V/STOL Aircraft** (3)

Static longitudinal stability, longitudinal and lateral dynamic stability, influence of aerodynamic parameters on flight characteristics, transfer function of V/STOL aircraft, effect of feedback on stability of V/STOL aircraft. Prerequisite: ME 271. (Fall)

*273 **Principles of Automatic Flight Control** (3)

Design of aeronautical instrumentation and feedback controls; mathematical models of sensors, controllers, and actuators; theory of feedback control, stability, accuracy, and speed of response; equalization effects of nonlinearities and noise. Prerequisite: EE 271 or approval of Department. (Fall)

*274 **Principles of Flight Guidance** (3)

Guidance requirements for atmospheric flight; implementation of guidance systems using inertial and radio techniques in conjunction with automatic data processing. Prerequisite: ME 273. (Fall)

275 **Stability and Control of Vehicles** (3)
(Formerly EM 265 Dynamic Stability of Airplanes)

Derivation of equations of motion, Euler transformations and direction cosines, stability derivatives and linearization of equations of motion, stability of linear systems with application to longitudinal and lateral dynamics, Laplace transform techniques and frequency response analysis. Prerequisite: ES 217 or approval of Department. (As arranged)

*276 **Mechanics of Space Flight** (3)
(Formerly EM 262)

First- and second-order Hamiltonian-Jacobi perturbation theory applied to artificial satellites, von Zeipel's methods, special and general perturbation theories for third-body perturbations. Differential correction of orbits by weighted least squares and minimum variance techniques. Comparison of various filtering techniques as applied to orbit determination and other space flight parameter estimation. Prerequisite: ES 217 or approval of Department. (As arranged)

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

***279 Special Topics in Flight Sciences (3)**

Current problems and methods in V/STOL flight dynamics, advanced flight concepts, instrumentation, guidance, and control. Prerequisite: approval of Department. (Spring)

280 Advanced Thermodynamics (3)

Statistical significance of the entropy concept, conditions of equilibrium, equilibrium of heterogeneous systems. Application of thermodynamic formalism to magnetic, electric, and solid systems; equilibrium of ionized gases; the Nernst postulate and the third law of thermodynamics. Prerequisite: graduate status. (Fall)

281 Nonequilibrium Thermodynamics (3)

Limitations of equilibrium thermodynamics, entropy production, phenomenological equations and linear laws; postulates of nonequilibrium thermodynamics, formulation of the equations of nonequilibrium systems, statistical foundations, stationary nonequilibrium states; selected applications. Prerequisite: ME 280. (Spring)

***283 Advanced Propulsion Systems (3)**

General theory of rocket propulsion; thermodynamic fluid flow and heat transfer analysis; performance and systems analysis for space applications. Chemical rocket propulsion; liquid, solid, hybrid rockets; air-breathing propulsion. Theory of combustion stability and efficiency; nuclear propulsion, reactor control theory, criticality, diffusion analysis, and advanced concepts. Basic concepts of electrical propulsion. Current problems in advanced propulsion. Prerequisite: approval of Department. (Spring)

284 Combustion Processes (3)

Thermodynamics of combustion, chemical kinetics, flame propagation, combustion of liquids and solids, detonation processes. Prerequisite: ME 280. (Fall)

285 Reaction Kinetics (3)

Theoretical aspects of kinetics of homogeneous and heterogeneous reactions in gaseous and liquid systems. Prerequisite: ME 280. (Spring)

286 Special Topics in Mechanical Engineering (2)

Prerequisite: approval of Department. (As arranged)

287 Heat Conduction (3)

Conduction of heat through solid, liquid, and gaseous media; formulation and methods of analytical, numerical, and analog solutions; steady two- and three-dimensional problems, problems in unsteady heat conduction; conduction in composite regions. Prerequisite: Ap S 213 or equivalent. (Fall)

288 Convective Heat and Mass Transfer (3)

Heat and momentum transfer in laminar and turbulent flow; application of boundary layer theory to problems of forced convection; the laminar boundary layer and similarity solutions; heat convection in turbulent flow, momentum-heat transfer analogy; the influence of temperature-dependent fluid properties; convective heat transfer at high velocities; mass transfer; formulation of a simplified theory; some solutions to the conserved property equation. Prerequisite: ME 221 or equivalent. (Spring)

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

289 Radiative Heat Transfer (3)

Nature of thermal radiation; radiative characteristics of surfaces; thermal radiation within evacuated enclosures; configuration factors algebra; solution methods for the integral equations of radiant interchange; enclosures containing an absorbing and emitting medium; absorbing, emitting, and scattering media; combined radiation, conduction, and convection. Prerequisite: Ap S 214 or equivalent. (Fall)

***290 Kinetic Theory of Gases (3)**

Equation of state and physical properties for gas composed of discrete particles; relation of kinetic theory to thermodynamics; Maxwell distribution of molecular velocities; Boltzmann H theorem. Molecular interactions, free paths, collision rates, scattering coefficients. Introduction to diffusion, viscosity, heat conduction; imperfect gases; flow of gases at low density. Prerequisite: ME 280. (Spring)

291–92 Energy Conversion (3–3)

Thermodynamics of energy conversion, duality of matter, semiconductor theory, thermoelectric engines, thermionic converters; magnetohydrodynamic engines, junction diodes, photovoltaic effects, solar cells, free energy fuel cells, conditions of equilibrium, construction of fuel cells. Prerequisite: graduate status. (ME 291—spring; ME 292—fall)

***293 Aerothermochemistry I (3)**

Thermodynamics of reacting systems, combustion kinetics, conservation equations, transport processes, laminar diffusion flames, laminar premixed flames, aspects of reacting inviscid flows. Prerequisite: approval of Department. (Fall)

***294 Aerothermochemistry II (3)**

Additional aspects of reacting inviscid flows, reacting boundary layers, heterogeneous combustion, turbulent flames, numerical methods in aerothermochemistry. Prerequisite: ME 293 or equivalent. (Spring)

295 Statistical Thermodynamics (3)

Distribution functions; Boltzmann, Bose-Einstein, and Fermi-Dirac statistics; partition functions, correspondence between classical and statistical thermodynamics. Systems with negligible effects of interparticle forces; perfect gases, perfect electron gas, photon gas. The Debye solid, the Einstein solid. Prerequisite: ME 280. (Spring)

296 Special Topics in Heat and Mass Transfer (3)

Selected heat and mass transfer problems of current interest such as temperature distribution and heat transfer rate in an ablating solid; heat transfer with boiling, two-phase flow in pipes, heat transfer to liquid metals, thermal contact resistance, heat transfer to non-Newtonian fluids. Prerequisite: approval of Department. (Fall)

297 Special Topics in Fluid Mechanics (3)

Selected topics in fluid mechanics of current interest, such as rarefied flow, hypersonic leading edge flow, method of series truncation, nonequilibrium wave propagation. Prerequisite: approval of Department. (Spring)

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

298 Research (arr.)

Research as arranged. May be repeated for credit. (Fall and spring

299–300 Thesis Research (3–3)

(Fall and spring)

310 Mechanics of Non-Newtonian Fluids (3)

Classification of fluids; physical properties of composite fluids; convected coordinate systems; fundamentals of constitutive equations of composite fluids; purely viscous fluids, Reiner and Rivlin theories, power-law fluids; linear theory of viscoelastic fluids, Boltzmann principle, quasi-linear viscoelasticity; nonlinear theory of viscoelasticity, Rivlin-Ericksen theory; viscoplastic fluids, Bingham plastic fluids, Oldroyd's analysis; viscometry and rheogoneometry; turbulent flow of suspensions and emulsions in pipes, frictional drag reduction by polymeric additives. Prerequisite: approval of Department. (Fall)

311 Nonsteady Flow (3)

Fundamental equations of nonsteady viscous flow; frames of reference, Eulerian and Lagrangian methods. Boundary conditions; characteristics and waves, isentropic and nonisentropic disturbances; discontinuities, interactions, special transients. Piston theory and the oscillating airfoil. Nonsteady flows with viscosity and entropy gradients. Prerequisite: ME 235 or equivalent. (Fall)

312 Theory of Turbulence (3)

Concept of turbulence, theory of transition, stability, isotropic turbulence, free turbulence, turbulence shear flows, transport process in turbulent flow. Prerequisite: ME 227. (As arranged)

315 Hypersonic Flow (3)

Small-disturbance theory, Newtonian theory; constant-density solution, theory of thin shock layers, flow over blunt bodies, hypersonic viscous flow, experimental techniques. Prerequisite: ME 235. (Fall)

317 Physical Gas Dynamics (3)

Molecular and atomic phenomena in gases, intermolecular forces, specific heats, equation of state for a real gas, dynamics of dissociating gas, radiation. Prerequisite: ME 235; ME 295 or equivalent. (Spring)

398 Advanced Reading and Research (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 Dissertation Research (arr.)

Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)

ENGINEERING SCIENCE COURSES

Engineering Sciences courses were formerly designated Engineering Mechanics (EM).

217 Analytical Mechanics (3)

Fundamental principles, generalized coordinates, variational principles and

Lagrange's equations, nonholonomic systems, Hamilton's equations, theory of small oscillations. Prerequisite or concurrent registration: Ap S 211. (Spring)

220 **Nonlinear Mechanics** (3)

Topological and analytical methods in nonlinear mechanics, nonlinear resonance, relaxation oscillations. Prerequisite: ES 217. (As arranged)

221 **Theory of Elasticity I** (3)

Infinitesimal strain and compatibility; stress, constitutive relations for isotropic solids, displacement and stress formulation of boundary value problems, energy principles, the reciprocal theorem, elements of pure torsion and flexure of rods; plane problems in elastostatics and dynamics illustrating stress function and Fourier transform methods. Prerequisite: approval of Department. (Fall)

222 **Theory of Elasticity II** (3)

Complex variable methods in plane static and dynamic problems; introduction to three-dimensional elastostatics, displacement potentials of Kelvin, Papkovich, and Galerkin; classical problems of Kelvin, Boussinesq, and Mindlin; Love's strain function and integral transform methods for axially symmetric problems; Somogliana and Betti integrals. Introduction to thermoelasticity. Prerequisite: Ap S 211, Ap S 213 (which may be taken concurrently), ES 221. (Spring)

228 **Physical Oceanography** (3)

Seawater, equations of motion, interaction between air and sea, currents, wind-waves in deep and shallow waters, long ocean waves, tides, wave-statistics, sea ice. Prerequisite: ME 221 or equivalent. (Spring)

*231 **Solid State for Engineers** (3)

Crystal structure and binding, elastic constants, lattice vibrations, thermal properties, free electron theory of metals, band theory of solids, semiconductors, rectifiers and transistors, superconductivity. Prerequisite: approval of Department. (Fall)

232 **Advanced Materials Science** (3)

Simple crystal structures; the defect crystal structure—point defects, line defects, surface defects; grain-boundaries; X-ray and electron diffraction; diffusion in solids, metallic solutions, and compounds; ceramics; polymeric materials; elastic properties; internal friction; geometry, statics, and dynamics of dislocations; microplasticity, plasticity, work-hardening, and fatigue; creep; strengthening mechanisms; radiation damage; cohesive strength. Prerequisite: approval of Department. (Fall)

234 **Composite Materials** (3)

Principles of composites and composite reinforcement; micromechanics and failure; interface reactions in various composites; reinforcing materials; structure of composites—fiber-reinforced polymers, filler-reinforced polymers, fiber-reinforced metals, directionally solidified alloys, dispersion-strengthened metals. Prerequisite: approval of Department. (Spring)

235 **Physical Metallurgy** (3)

Relations among structures, properties, and reactions of metals and alloys;

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

structures and equilibria, kinematics of physical and chemical reactions; plastic deformation mechanisms, diffusion, solid reactions; phase diagrams and phase transformations, recrystallization and grain growth; dislocations—their formation and multiplication in crystal structures; elementary strengthening mechanisms. Prerequisite: approval of Department. (As arranged)

236 Wave Propagation in Solids (3)

Small amplitude plane and spherical wave propagation in unbounded elastic media; dilational, shear, and surface waves; reflection and refraction of plane waves; free waves in finite bodies. Prerequisite: ES 221 or approval of Department.

***237 Quantum Mechanical Treatment of Metals (3)**

Elements of quantum mechanics, including Schroedinger equation and elementary perturbation theory. Applications to basic processes in the theory of solids: lattice waves, electron states, electron-electron and electron-phonon interactions. Boltzmann equation and transport properties; Fermi surfaces; theory of superconductivity. Prerequisite: ES 231 or approval of Department. (Spring)

***239 Physical Ceramics (3)**

Crystal chemistry and the systematic study of the structure of ceramic materials; solid reactions occurring at elevated temperatures; sintering, vitrification, diffusional mechanisms and effects; reaction rate theory; elastic, anelastic, and plastic properties of ionic and covalent solids: viscoelastic behavior of vitreous and vitreous-solid systems; phase equilibria of ceramic systems. Prerequisite: approval of Department. (Spring)

240 Fracture Mechanics (3)

Fundamentals of brittle fracture, Griffith theory and extensions, mechanics of fracture, linear elastic systems, plasticity considerations, fracture toughness, engineering analysis, notch strength analysis with limit approach, crack propagation laws, fatigue, fracture testing, comparison of recent continuum theories. Prerequisite: approval of Department. (Spring)

256 Introduction to the Theories of Inelastic Media (3)

Physical basis of anelasticity, viscoelasticity, plasticity, and viscoplasticity; constitutive equations of elastic and viscoelastic media; foundations of the theories of plasticity and viscoplasticity; one- and two-dimensional boundary value problems in linear-visco-elastic and elastic-plastic media; the rigid-plastic medium; simple problems in nonlinear viscous and visco-plastic media; wave propagation in inelastic media. Prerequisite: approval of Department. (Fall)

259 Nonlinear Mechanics of Continua (3)

Development of fundamental concepts of nonlinear media and their applications. Prerequisite: Ap S 212 and ES 221, or ES 256. (As arranged)

***263 Atmospheric Physics for Engineers (3)**

Introduction to physical processes in the earth's atmosphere: comparisons to the atmospheres of other planets. Topics: evolution, structure, dynamics, visible phenomena, the ionosphere, and radiation processes. Prerequisite: approval of Department. (As arranged)

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

*270 **Introduction to Acoustics** (3)

Waves in an infinite medium, energy and intensity, transmission in layered media, source and dipole fields, electrical and acoustical analogies, resonators, horns and wave guides, normal modes and sound sources in ducts, physiological and architectural acoustics. Prerequisite: approval of Department. (As arranged)

*271 **Random Process Theory I** (3)

Probability theory and distributions; random variables and types of random processes; relations between correlation functions, power spectra, and indicial response; measurement and use of power spectra; behavior of physical systems under random inputs. Prerequisite: approval of Department. (As arranged)

*272 **Random Process Theory II** (3)

Discrete and continuous state Markov-processes; chains, queues, diffusion, and passage problems; linear and nonlinear estimation and stochastic control; estimation of correlations and power spectra; applications in communication theory; scattering from random surfaces; stochastic linearization and stability. Prerequisite: ES 271. (As arranged)

*273 **Time Series Analysis** (3)
(Formerly EM 218)

General properties of stationary and nonstationary random processes. Correlation techniques, types of harmonic analysis, analog and digital spectral estimation, variability of estimates, prediction and filtering of time series. Applications in communications, vibration, and fluid dynamics. Prerequisite: approval of Department. (As arranged)

*274 **Noise and Vibration Control** (3)

Introduction to the physical effects of noise and vibration on man, practical sources of noise and their control; building noise, ventilation system noise, mechanical equipment noise, aircraft noise; noise and vibration isolations and absorptions, mufflers; noise control by community planning, legal aspects of noise. Prerequisite: ES 270, 275. (As arranged)

*275 **Advanced Theoretical Acoustics** (3)

Classical scattering and diffraction problems, coupled acoustical and mechanical systems, acoustics of moving sources, propeller noise, principle of least time, Snell's law and ray tracing, introduction to boundary and jet noise. Prerequisite: ES 270, ME 215. (As arranged)

*276 **Acoustical and Mechanical Measurements** (3)

Characteristics of signals, basic transducer elements, standards of measurements and calibrations, signal recording and processing, acoustical and vibration instrumentation, flow dynamical measurements, hot wire anemometry, optical techniques. Prerequisite: approval of Department. (As arranged)

*277 **Physical Acoustics** (3)

Waves in dissipative media, nonlinear aspects of acoustics, acoustic streaming, unsteady boundary layers, interaction of sound with turbulence, aerodynamic noise generation, atmospheric attenuation, thermal and viscous phenomena. Prerequisite: ES 275, ME 221. (As arranged)

*Offered at NASA-Langley Research Center; may be offered on campus when arranged.

***278 Psychological and Physiological Acoustics (3)**

Anatomy and physiology of the ear, experimental methodology in psycho acoustics, subjective responses to noise, acoustical controls and displays effects of aircraft noise and sonic boom on people, human response criteria for noise control, effects of noise on human performance and physiology current problems in acoustical theory and technology. Prerequisite: approval of Department. (As arranged)

***279 Human Factors in Engineering (3)**

Man-machine interface, effects of physical stresses on human behavior and performance, life support system, learning and conditioning of physical stresses. (Spring)

***280 Special Topics in Acoustics (3)**

Current methods and problems in acoustics. Topics chosen from such areas as aerospace noise generation and control; instruments and procedures for acoustics measurements; and responses of structures, people, and communities to noise. Prerequisite: approval of Department. (As arranged)

284 Numerical Methods in Engineering (3)

Review of programming fundamentals; matrix operations and solution of simultaneous equations; difference methods and computer solution of ordinary and partial differential equations; numerical solution of initial and boundary value problems in heat transfer, fluid flow, and structural mechanics. Prerequisite: approval of Department. (As arranged)

285 Finite-element Methods in Engineering Mechanics (3)

Derivation of fundamental equations based on energy formulation; stiffness properties of basic finite elements; solution of problems in plane stress and strain, plane- and space-framed structures; plate and shell structures; elastoplastic and dynamic analysis. Prerequisite: approval of Department. (Spring)

***286 Analysis and Design of Thin-walled Structures (3)**

Statistics of thin-walled beams and panels, force interplay between stiffeners and skin in the analysis and design of stiffened thin-walled structures; strength and stiffness of locally buckled stiffened structures; classification of loads and safety factors; different considerations governing the design of thin-walled structures; critical evaluation of various structural design procedures. Prerequisite: CE 261, 263; ES 285. (As arranged)

***287 Automated Design of Complex Structures (3)**

Review of techniques for automated design including mathematical programming, fully stressed design, and optimality criteria; application of automated design techniques to stiffened and composite shell-type structures; multiple-load conditions and design constraints. Prerequisite: approval of Department. (As arranged)

289 Special Topics in Structural Design (3)

Prerequisite: approval of Department. (As arranged)

290 Special Topics in Nonlinear Mechanics of Continua (3)

Introduction to special topics in nonlinear theories of continuous media

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.

such as the elastic dielectric, multi-polar theories, continuous theory of dislocations; crystal elasticity based on quantum-solid state considerations. Prerequisite: ES 259. (As arranged)

298 **Research (arr.)**

Basic research projects as arranged. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research (3–3)**

(Fall and spring)

*310 **Aeroacoustics** (3)

General theory of aerodynamic sound generation and propagation, Lighthill's formulation of jet noise, similarity laws, supersonic and subsonic jet noise, boundary layer noise, fan and compressor noise, helicopter noise, sonic booms. Current problems in aeroacoustics. Prerequisite: ES 275. (As arranged)

*311 **Nonlinear Acoustics** (3)

Finite amplitude waves and waves in moving stratified media. Interaction between linear and nonlinear waves, wave propagation through nonlinear media, applications to transmission of sound through ducts with flow and absorbing walls. Prerequisite: approval of Department. (As arranged)

*312 **Theory of Random Vibration** (3)

Stationary random inputs and responses, random excitation of linear systems, nonstationary random inputs and responses. Random excitation of nonlinear systems, vibration fatigue failure, response of space vehicle structures to intense noise fields, measurements and applications. Prerequisite: ES 272, ME 215. (As arranged)

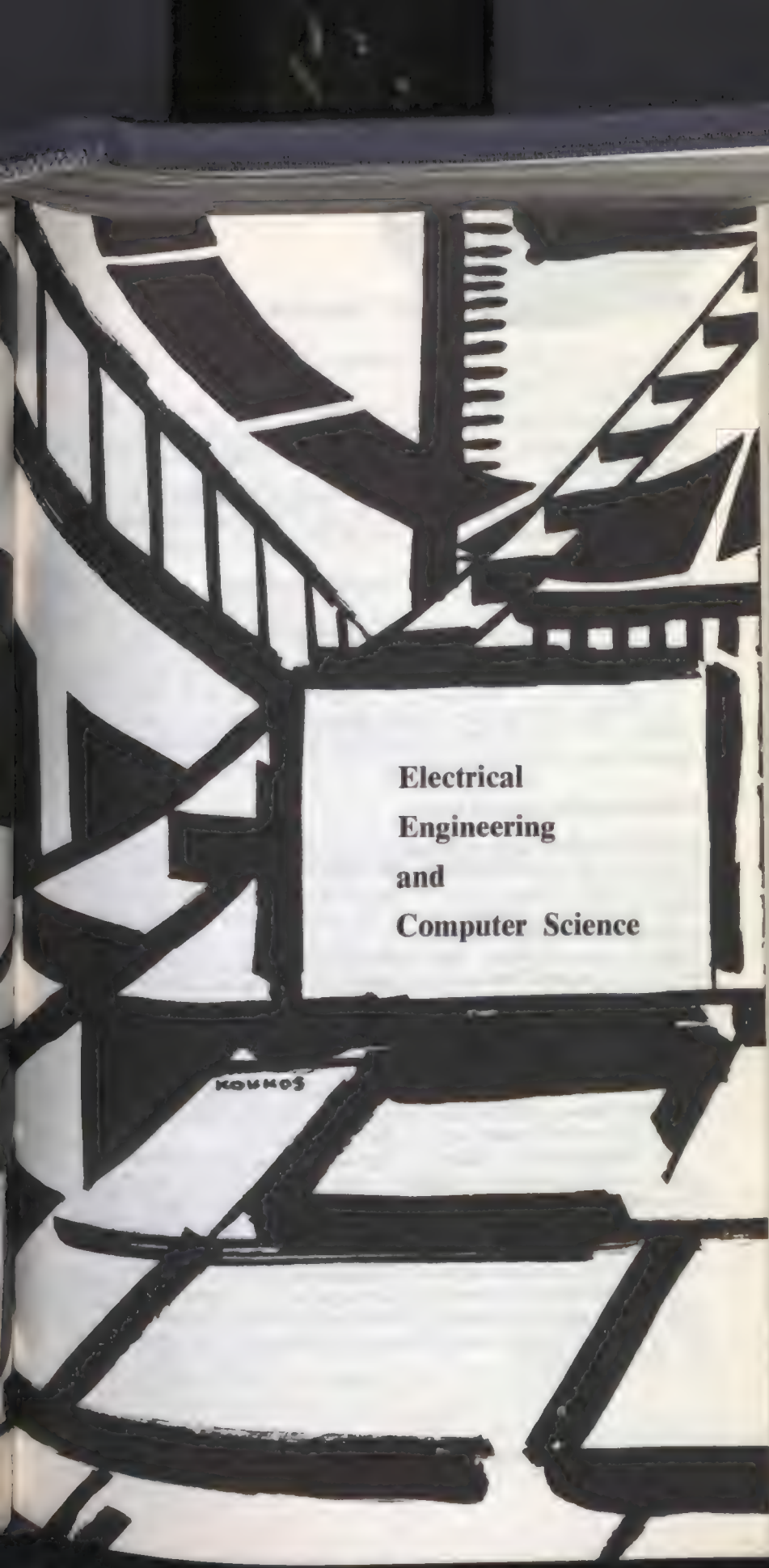
398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)

Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)

* Offered at NASA-Langley Research Center; may be offered on campus when arranged.



Electrical Engineering and Computer Science

Electrical Engineering and Computer Science*

Professors R.B. Heller, Guenther Hintze *(Research)*, W.K. Kahn *(Chairman)*, Raymond Pickholtz

Adjunct Professors F.K. Harris, C.A. Caceres, Charles Feldman, Ernst Weber

Professorial Lecturers W.F. Crosswell, S.J. Raff, P.H. Enslow, Jr.

Associate Professors E.H. Braun, Marvin Eisenberg, A.C. Meltzer, Nicholas Kyriakopoulos

Associate Professorial Lecturers M.E. Brady, C.L. Fricke, J.P. Fennell, B.P. Lathi, Wasyl Wasylkiwskyj, J.M. Clark, B.M. Horowitz, Leonard Schuchman, A.R. Shulman, Richard Van Blerkom, W.H. Carter, Allen Das, R.H. Thompson

Assistant Professors N.A. Sloan, Vallobh Vimolvanich, Abd-elfattah Abd-alla, J.S. Huang, R.H. Lang

Assistant Professorial Lecturers D.O. Baechler, D.C. Rohlfs, J.K. Cooper, W.H. Fuhr, Maurice Morin, M.I. Celebiler, F.S. LeBeau, J.H. O'Hara, J.J. Rocchio, Jr., George Saxton, J.A. Friedhoffer, P.J. Martin, R.E. Merwin, H.F. Mitchell, Jr., J.L. Wolfgang, Jr., Pi-Fuay Chen, L.G. Hull, R.E. Lyons, Iwao Sugai, W.J. English, Gerald Farmer, J.M. Hlavin, Elmer Lipsey, W.C. Scales, J.W. Benoit, G.W. Haigler, R.M. Nicholson, J.R. Silverman

Special Lecturer Peter Bock

UNDERGRADUATE STUDY

Electrical engineering is a branch of engineering in which practical as well as theoretical and scientific aspects are integrated to provide a well-balanced discipline. Basic sciences such as physics and mathematics form the roots on which electrical engineering builds to create a truly applied science and to develop the techniques necessary to solve problems. Analysis, synthesis, and design go hand in hand. The electrical engineering curriculum is designed to provide the student with such an integrated approach. The first two years of the curriculum are common to all undergraduate fields in the School and are devoted to developing a sound foundation of basic sciences coupled with engineering sciences. The third year continues with engineering sciences and starts going deeper into electrical engineering. The fourth year is totally devoted to electrical engineering. At the fourth year the student has a choice of either following the regular electrical engineering curriculum or branching off into an area of concentration in computer science.

The Department of Electrical Engineering and Computer Science has recently acquired modern laboratory equipment, including its own computer. The student has an opportunity during his last year to work on individual projects where his ingenuity, coupled with faculty advice and guidance, permits him to concentrate in areas such as computers, communications, microwaves, controls, electronics, medical engineering, circuits, and others.

The scheduling of courses has been arranged to accommodate both the full-time and the part-time student. Undergraduate courses are offered once a year during the day for full-time students, and once every two years in the evening for part-time students.

* Staff of instruction for the academic year 1971–72.

SUBJECT AREAS

Networks

EE 11: Linear Networks I
EE 12: Linear Networks II
EE 113: Network Analysis and Design
EE 114: Linear Active Networks

Fields and Waves

EE 31: Fields and Waves I
EE 32: Fields and Waves II
EE 133: Electromagnetic Waves

Electronics

EE 20: Introductory Engineering Electronics
EE 121: Engineering Electronics and Design
EE 122: Pulse and Waveshaping Electronic Design

Communications

EE 143: Elements of Communication Engineering I
EE 144: Elements of Communication Engineering II

Computer Science

EE 51: Applications of Computers
EE 152: Introduction to Digital Computers
EE 153: Design of Switching Systems
EE 154: Digital Computer Design
EE 155: Introduction to Numerical Methods for Computers
EE 156: Introduction to System Programming
EE 157: Machine and Assembly Language Programming
EE 158: Algorithmic Methods and High-level Languages

Laboratories and Measurement

EE 60: Introductory Electrical Engineering Laboratory I
EE 61: Introductory Electrical Engineering Laboratory II
EE 160: Electrical Measurements
EE 161–62: Electrical Engineering Laboratory

Controls and Systems

EE 172: Control Systems
EE 177: Electrical Energy Conversion

Medical Engineering

EE 184: Introduction to Medical Engineering

CURRICULUM IN ELECTRICAL ENGINEERING

First Semester

Ap S 1:	Engineering in Modern Society (1)
Engl 1 or 1x:	English Composition: Language as Communication (3)
Math 30:	Precalculus (3)
Phys 1:	General Physics (4)
Elective:	Selected from humanities or social sciences (3)

Second Semester

Ap S 2:	Engineering in Modern Society (1)
EE 51:	Applications of Computers (3)
Math 31:	Calculus of One Variable (3)
Phys 2:	Introduction to Modern Physics (4)
Elective:	Selected from humanities or social sciences (3)

Third Semester

Ap S 115:	Probabilistic and Statistical Methods in Engineering (3)
Chem 13:	General Chemistry (4)
Math 32:	Calculus of Several Variables (3)
Phys 31:	Introduction to Theoretical Physics (2)
Phys 51:	Introduction to Experimental Physics (2)
Elective:	Selected from humanities or social sciences (3)

Fourth Semester

Ap S 59:	Introductory Analytical Mechanics (4)
Ap S 113:	Engineering Analysis I (3)
CE 140:	Materials Science (3)
Phys 32:	Introduction to Theoretical Physics (2)
Phys 52:	Introduction to Experimental Physics (2)
Elective:	Selected from humanities or social sciences (3)

Fifth Semester

Ap S 114:	Engineering Analysis II (3)
EE 11:	Linear Networks I (3)
EE 31:	Fields and Waves I (3)
EE 60:	Introductory Electrical Engineering Laboratory I (2)
ME 131:	Thermodynamics (3)
Elective:	Selected from humanities or social sciences (3)

Sixth Semester

EE 12:	Linear Networks II (3)
EE 20:	Introductory Engineering Electronics (3)
EE 32:	Fields and Waves II (3)
EE 61:	Introductory Electrical Engineering Laboratory II (2)
EE 152:	Introduction to Digital Computers (3)
Elective:	Selected from humanities or social sciences (3)

Seventh Semester

EE 113:	Network Analysis and Design (3)
EE 121:	Engineering Electronics and Design (3)
EE 133:	Electromagnetic Waves (3)
EE 143:	Elements of Communication Engineering I (3)

EE 161: Electrical Engineering Laboratory (2)
EE 177: Electrical Energy Conversion (3)
or EE 184: Introduction to Medical Engineering (3)

Eighth Semester

EE 114: Linear Active Networks (3)
EE 122: Pulse and Waveshaping Electronic Design (3)
EE 144: Elements of Communication Engineering II (3)
EE 160: Electrical Measurements (3)
EE 162: Electrical Engineering Laboratory (2)
EE 172: Control Systems (3)

Computer Science Option

Computer science is a new and developing discipline which combines the electronic design and mathematical utilization of computers into a single comprehensive area. The student who completes this option will be able to design both the hardware and software needed for large-scale computing systems. The curriculum prepares the student for graduate school or for a career in computer design and applications.

First Semester

Ap S 1: Engineering in Modern Society (1)
Engl 1 or 1x: English Composition: Language as Communication (3)
Math 30: Precalculus (3)
Phys 1: General Physics (4)
Elective: Selected from humanities or social sciences (3)

Second Semester

Ap S 2: Engineering in Modern Society (1)
EE 51: Applications of Computers (3)
Math 31: Calculus of One Variable (3)
Phys 2: Introduction to Modern Physics (4)
Elective: Selected from humanities or social sciences (3)

Third Semester

Ap S 115: Probabilistic and Statistical Methods in Engineering (3)
Chem 13: General Chemistry (4)
Math 32: Calculus of Several Variables (3)
Phys 31: Introduction to Theoretical Physics (2)
Phys 51: Introduction to Experimental Physics (2)
Elective: Selected from humanities or social sciences (3)

Fourth Semester

Ap S 59: Introductory Analytical Mechanics (4)
Ap S 113: Engineering Analysis I (3)
CE 140: Materials Science (3)
Phys 32: Introduction to Theoretical Physics (2)
Phys 52: Introduction to Experimental Physics (2)
Elective: Selected from humanities or social sciences (3)

Fifth Semester

Ap S 114: Engineering Analysis II (3)

EE 11:	Linear Networks I (3)
EE 31:	Fields and Waves I (3)
EE 60:	Introductory Electrical Engineering Laboratory I (2)
ME 131:	Thermodynamics (3)
Elective:	Selected from humanities or social sciences (3)

Sixth Semester

EE 12:	Linear Networks II (3)
EE 20:	Introductory Engineering Electronics (3)
EE 32:	Fields and Waves II (3)
EE 61:	Introductory Electrical Engineering Laboratory II (2)
EE 152:	Introduction to Digital Computers (3)
Elective:	Selected from humanities or social sciences (3)

Seventh Semester

EE 113:	Network Analysis and Design (3)
EE 121:	Engineering Electronics and Design (3)
EE 153:	Design of Switching Systems (3)
EE 155:	Introduction to Numerical Methods for Computers (3)
EE 157:	Machine and Assembly Language Programming (3)
EE 161:	Electrical Engineering Laboratory (2)

Eighth Semester

EE 122:	Pulse and Waveshaping Electronic Design (3)
EE 154:	Digital Computer Design (3)
EE 156:	Introduction to System Programming (3)
EE 158:	Algorithmic Methods and High-level Languages (3)
EE 162:	Electrical Engineering Laboratory (2)
EE 172:	Control Systems (3)

COURSES

11 Linear Networks I (3)

Circuit concepts, elements, and parameters; network conventions and equations: mesh and node analysis; network solutions using differential equations and initial conditions; transient and steady-state response; impedance concepts; energy and power; resonance. Prerequisite: Ap S 113, Phys 32. (Fall—day and evening)

12 Linear Networks II (3)

Singular functions; Laplace transform; network functions, poles and zeros; total response; time and frequency domains; convolution theorems; Fourier analysis, spectra; frequency response, Bode plots; two-port parameters. Prerequisite: Ap S 114, EE 11. (Offered every year: spring—day 1972–73 and alternate years: spring—evening)

20 Introductory Engineering Electronics (3)

Various types of devices used in electronic engineering considered from the point of view of the physics of their operation and from the engineering point of view of their application to electronic circuits. Solid-state, vacuum, and gaseous devices. Primary emphasis on application of these elements in power supplies and in linear amplifiers. Introduction of design concepts through use of graphical techniques. Prerequisite: EE 11 (Spring—day and evening)

31 Fields and Waves I (3)

Vector calculus, orthogonal coordinates, Coulomb's and Gauss' laws, scalar potential, dipoles, method of images; Laplace's and Poisson's equations, boundary value problems. Prerequisite: Phys 32. Prerequisite or concurrent registration: Ap S 114. (Offered every year: fall—day; 1972–73 and alternate years: fall—evening)

32 Fields and Waves II (3)

Biot-Savart law, Ampere's law, vector potential, magnets, polarization and polarization currents, Faraday's law, Maxwell's equations, plane waves, and Poynting vector. Prerequisite: EE 31. (Offered every year: spring—day; 1972–73 and alternate years: spring—evening)

51 Applications of Computers (3)

Solution of problems on digital computers, using machine language, FORTRAN, data processing, and numerical methods. Writing, debugging, and running programs on a digital computer. (Fall—evening; spring—day and evening)

60 Introductory Electrical Engineering Laboratory I (2)

Use, theory of design, and application of standard electronic laboratory equipment; applications of instrumentation through experiments in basic network theorems; measurement of electrical quantities and characteristics of electrical devices. Prerequisite or concurrent registration: EE 11, 31. (Fall—day and evening)

61 Introductory Electrical Engineering Laboratory II (2)

Characteristics of electronic devices and circuits; design of electronic amplifiers and measurement of their properties; experiments in support of courses in networks, fields, and electronics. Prerequisite or concurrent registration: EE 12, 20, 60. (Offered every year: spring—day; 1973–74 and alternate years: spring—evening)

113 Network Analysis and Design (3)

Application of matrices and linear graphs to electrical networks; trees, circuits, cut-sets; network equations; signal-flow graphs; introduction to state-space techniques; computer solutions; network transfer functions; properties and synthesis of two-element, one-port networks; filter theory and design; computer-aided circuit design. Prerequisite: EE 12, 20. (Offered every year: fall—day; 1972–73 and alternate years: fall—evening)

114 Linear Active Networks (3)

Description of networks by terminal and port concepts; power and scattering parameters; analysis of active networks, including negative impedance converters, gyrators, etc.; interconnection of networks; properties of active networks, including reciprocity, stability, activity, and feedback. Prerequisite: EE 113. May be taken for graduate credit. (Spring—day and evening)

121 Engineering Electronics and Design (3)

Graphical analysis and design beyond the level covered in Electrical Engineering 20. Introduction of incremental analysis and design methods to electronic circuits; use of equivalent circuits; amplifiers, oscillators, modulation, and demodulation. Prerequisite: EE 20. (Offered every year: fall—day; 1972–73 and alternate years: fall—evening)

122 Pulse and Waveshaping Electronic Design (3)

Introduction to and design of the type of nonlinear circuits used in modern-day computer and communications systems. Pulse, sweep, switching and logic circuits; counting and timing circuits. Prerequisite: EE 121. (Offered every year: spring—day; 1972–73 and alternate years: spring—evening)

133 Electromagnetic Waves (3)

Time-harmonic Maxwell equations, complex Poynting vector, transmission lines, characteristics of common waveguides, resonant cavities, Smith chart, Lorentz reciprocity, simple antennas, linear antenna arrays. Prerequisite: EE 32. (Fall—day)

143 Elements of Communication Engineering I (3)

Fourier series and transforms; power spectra and correlation; principles of modulation; amplitude, angle, and pulse modulation; modulation and demodulation systems; time and frequency division multiplexing. Prerequisite or concurrent registration: EE 113, 121. (Offered every year: fall—day; 1973–74 and alternate years: fall—evening)

144 Elements of Communication Engineering II (3)

Introduction to the statistical theory of communication, random signals and noise, concepts of information theory, transmission of information over noisy channels, comparison of modulation systems in the presence of noise. Prerequisite: EE 143. (Offered every year: spring—day; 1973–74 and alternate years: spring—evening)

152 Introduction to Digital Computers (3)

Introduction to the use and structure of digital computers, addressing methods, data processing, and machine language programming; Boolean algebra and introduction to the design of combinational switching circuits, number systems and arithmetic in digital machines; machine subsystems and their interconnections; use of software systems and software-hardware relationships. Prerequisite: EE 51 or permission of instructor. (Offered every year: spring—day; 1972–73 and alternate years: spring—evening)

153 Design of Switching Systems (3)

Switching algebra and Boolean logic; analysis and design of switching devices; design of combinational and sequential logic networks; minimization techniques and their use in logic design; electronic implementation of logic; number systems and codes, geometric interpretation, error-correcting codes; encoding and decoding; logic and electronic design of functional digital units. Prerequisite: EE 152 or permission of instructor. May be taken for graduate credit. (Fall—day and evening)

154 Digital Computer Design (3)

Logic and electronic design of functional digital units, design of computer subsystems, flow of information and logical flow diagrams in timing and control; design of memory, arithmetic, and I/O units; binary and decimal machine arithmetic; design of a digital computer. Prerequisite or concurrent registration: EE 153 or permission of instructor. May be taken for graduate credit. (Spring—day and evening)

155 Introduction to Numerical Methods for Computers (3)

Use of numerical methods in engineering and scientific problems, concepts of algorithm and flowcharts, errors in computer and numerical methods.

Introduction to numerical methods for the solution of simultaneous linear algebraic equations, roots of equations, numerical differentiation, and integration; the solution of ordinary differential equations. Statistical methods for the evaluation of experimental data and correlation techniques. Prerequisite: EE 51 or equivalent. (Offered every year: fall—day; 1973–74 and alternate years: fall—evening)

156 **Introduction to System Programming** (3)

Introduction to computer software and software systems; management of computer software; concepts in the use of macro-assemblers, loaders, monitors, and executive systems; control of input-output and utility programs; recursive and reentrant programming for time-shared systems; introduction to multiprogramming and multiprocessor software systems. Prerequisite: EE 157 or permission of instructor. May be taken for graduate credit. (Offered every year: spring—day; 1973–74 and alternate years: spring—evening)

157 **Machine and Assembly Language Programming** (3)

Machine and assembly language programming in fixed and variable word-length computers; techniques in addressing and machine control; data structures and data processing; use of subroutine linkages; co-routines, pushdown lists, list processing, loops and input-output subroutines; use of a macro-assembly language; sorting, merging, arrays, and data fields in data processing. Prerequisite: EE 152 or equivalent, or permission of instructor. May be taken for graduate credit. (Fall—day and evening)

158 **Algorithmic Methods and High-level Languages** (3)

Introduction to high-level procedural and problem-oriented computer languages; data structures and choice of a data processing language. List processing, string processing, and introduction to information retrieval; large data bases and their use in time-shared systems; simulation languages; introduction to heuristic programming. Prerequisite: EE 51 or equivalent and permission of instructor. May be taken for graduate credit. (Spring—day and evening)

160 **Electrical Measurements** (3)

Electrical measurements, from direct current through radio frequencies; techniques; detectors; bridges; measurement of current, voltage, power, resistance, capacitance, inductance, energy, phase angle, frequency, and time; dielectric and magnetic measurements; topics in high-frequency measurement, including field strength, signal-to-noise ratio, impedance, attenuation. Prerequisite: EE 12, 20. (Spring—evening)

161–62 **Electrical Engineering Laboratory** (2–2)

Experiments in support of courses in networks, electronics, microwaves, computers, communications, controls, and machines. The student is required to begin a design project in the first half of the course; the completion of this project is the major effort of the second half. Prerequisite or concurrent registration: EE 61, 113, 121, 152. EE 161 is prerequisite to EE 162. (Academic year—day and evening)

172 **Control Systems** (3)

Analysis and design of linear feedback control systems. Applications of stability criteria, steady-state and transient analyses. Prerequisite: EE 12, 20. (Offered every year: spring—day; 1972–73 and alternate years: spring—evening)

177 Electrical Energy Conversion (3)

Fundamentals of electromechanical energy conversion. Electromechan cal transducers and their equivalent circuits, three-phase and single-phas a-c rotating machines, d-c machines, rotating machines as circuit el ments. Prerequisite: EE 12. (Offered every year: fall—day; 1973–7 and alternate years: fall—evening)

184 Introduction to Medical Engineering (3)

Designed to introduce the engineering or physical sciences student to th applications of engineering in the medical sciences; terminology of th medical profession emphasized; the physiology of the human body pre sented from over-all systems or functional approach; survey of present-d medical measurements and consideration of those areas in which engi neering may be applied advantageously to medicine. May be taken fo graduate credit. Admission by permission of instructor. (Fall—da and evening)

198 **Research (1 to 3)**

Applied research and experimentation projects, as arranged. Prerequisite junior or senior status. (Fall and spring)

GRADUATE STUDY

Electrical engineering, at the graduate level, provides one of the most stimulat ing experiences in advanced studies. The student has reached a degree o maturity and basic knowledge that allows him to enter into new avenues o exciting work. Courses prepare the student in areas of concentration such as networks, control, and systems; electrophysics (electronics, fields and waves communications; medical engineering; and computer science (hardware an software). Depending upon the interest of the student, some of the programs leading to the degree of Master of Science are given at the NASA-Langley Research Center, Langley Station, Hampton, Virginia. NASA-Langley's ex tensive scientific and engineering facilities and equipment are utilized whenever feasible. Arrangements can also be made to us the facilities of the Naval Sho Research and Development Laboratory, Annapolis, Maryland, where an off campus Master's degree pilot program has been initiated.

The graduate programs are formulated to take into consideration the stu dent's individual strengths, potentials, skills, aspirations, and abilities. Deter mined through consultation by the student and his faculty adviser, their pur pose is to provide the student with a thorough understanding of his area o concentration and at the same time to provide him with the breadth of knowl edge necessary in modern engineering.

The graduate programs are, in addition, designed to provide a needed educa tional service to the Washington technical community. Many of the courses have been developed after consultation with private industry and governmen agencies of the area. They are offered during both the afternoon and evening with a principle of rotation from year to year.

The Department of Electrical Engineering and Computer Science has con tinuously kept the graduate program up to date, through constant contact with recent developments, through its own research, and through the addition o several experts in appropriate fields serving as part-time and adjunct faculty The Department provides a well-balanced, modern graduate program.

In order to provide the student with detailed information about its graduate programs, from the point of view of procedures, requirements, regulations, and scope, the Department of Electrical Engineering and Computer Science publishes annually a detailed brochure to supplement the present catalogue. In addition, the Department publishes special pamphlets describing specific programs.

AREAS OF CONCENTRATION

Networks, Control, and Systems

EE 211: Advanced Network Analysis I
EE 212: Advanced Network Analysis II
EE 215: Linear Network Synthesis I
EE 216: Linear Network Synthesis II
EE 271: Automatic Control in State Space Setting
EE 272: Digital Control Systems
EE 273: Optimal Programming and Control
EE 274: Nonlinear Control Systems
EE 275: Stochastic Processes in Automatic Control
EE 276: Cybernetics
EE 278: Spacecraft Systems Design
EE 319: Networks Research
EE 371: Simulation Methods for System Analysis
EE 372: Analysis and Control of Large Systems
EE 379: Controls and Systems Research

Electrophysics (Electronics, Fields and Waves)

EE 221: Physical Electronics I
EE 222: Physical Electronics II
EE 225: Nonlinear Electronics
EE 226: Optical Electronics
EE 227: Industrial Electronics
EE 228: High-frequency Electronics
EE 229: Precise Optical Measurements
EE 230: Electromagnetic Theory
EE 231: Field Analysis and Potential Theory
EE 232: Electrodynamics
EE 233: Microwaves and Components
EE 234: Electromagnetic Wave Propagation
EE 235: Antennas
EE 236: Magnetohydrodynamics
EE 238: Precise Microwave Measurements
EE 239: Precise Electrical Standards
EE 255: Optical Processing
EE 323: Principles of Microelectronics
EE 325: Principles of Lasers
EE 329: Electronics Research
EE 339: Fields and Waves Research

Communications

EE 241: Information Theory I
EE 242: Information Theory II

EE 243: Communication Theory I
EE 244: Communication Theory II
EE 245: Signal Detection and Estimation Theory
EE 246: Digital Communications
EE 247: Communication Systems
EE 248: Microwave Communication Systems
EE 277: Space Communication Systems
EE 349: Communications Research

Medical Engineering

EE 281: Electronic Measurements in Medicine
EE 282: Instrumentation in Medical Electronics
EE 283: Introduction to Medicine for Engineers I
EE 284: Introduction to Medicine for Engineers II
EE 285: Engineering in Vocational Medicine and Rehabilitation
EE 389: Medical Engineering Research

Computer Science (Hardware and Software)

CS 215: Computer Graphics and Pattern Recognition
CS 216: Information Retrieval Systems
CS 231: Finite State Machines
CS 232: Finite Automata
CS 237: Computing Systems
CS 238: Advanced Computing Systems
CS 240: Theory and Practice of Microprogramming
CS 263: Digital Computer Programming Systems
CS 264: Design of Compilers and High-level Languages
CS 265: Systems Programming
CS 278: Analog and Hybrid Computers
CS 284: Applications of Numerical Methods
CS 391: Computer Science Research

ELECTRICAL ENGINEERING COURSES

201 **Natural Modes and Transients in Electrical Systems** (3)

Transient response and natural modes of electrical systems; techniques for analyzing systems with periodic and aperiodic inputs and outputs; sampling. (Fall and spring)

204 **Stochastic Signals and Noise** (3)

Density functions, probability, distributions and moments, discrete and continuous random variables, stochastic processes, stationarity, ergodicity, correlation functions, and power spectra. Functional transformation of stochastic electrical signals through linear and nonlinear systems. Prerequisite: Ap S 115 or equivalent.

211 **Advanced Network Analysis I** (3)

Network theorems; network functions, relationship of parts of network functions; analytic properties. Fourier analysis, impulse response, convolution, numerical techniques for computer solution. Computer-aided design. Prerequisite: EE 113 or permission of instructor. (1973–74 and alternate years: fall—evening)

212 **Advanced Network Analysis II** (3)

Applications of linear graphs to networks; topological analysis; formula-

tion and solution of state-space equations; formulation for computer solution. Advanced network properties, realizability, causality, controllability, and observability concepts. Prerequisite: EE 211 or 271. (1972–73 and alternate years: spring—day; 1973–74 and alternate years: spring—evening)

215 **Linear Network Synthesis I** (3)

Properties and testing of positive real functions. Synthesis of LC, RL, RC one-port networks. Brune, Bott-Duffin, Miyata, Kuh, and Darlington synthesis techniques. Introduction to two-port ladder and lattice synthesis. Three-terminal RC network synthesis approximation in the frequency and time domains. Prerequisite: EE 113 or permission of instructor. (1972–73 and alternate years: fall—evening; 1973–74 and alternate years: fall—day)

216 **Linear Network Synthesis II** (3)

Advanced topics in passive one-port and two-port synthesis. Introduction to n-port synthesis. Active network synthesis using negative resistance, controlled sources, NIC, gyrator, operational amplifiers, and circulators. Synthesis of distributed integrated networks. Computer-aided network optimization. Prerequisite: EE 215. (1972–73 and alternate years: spring—evening; 1973–74 and alternate years: spring—day)

221 **Physical Electronics I** (3)

Theoretical principles underlying the operation of electronic devices; classical mechanics and classical statistical mechanics, the quantum theory, wave and matrix mechanics, quantum statistics. Prerequisite: graduate status. (1972–73 and alternate years: fall—day; 1973–74 and alternate years: fall—evening)

222 **Physical Electronics II** (3)

The Boltzmann transport equation, band theory of solids, time-dependent perturbation theory, group theory. Applications to semiconductor and other solid-state devices such as transistors, tunnel diodes, masers, and lasers. Prerequisite: EE 221. (1972–73 and alternate years: spring—day; 1973–74 and alternate years: spring—evening)

225 **Nonlinear Electronics** (3)

Analysis and design of electronic components and systems operating as switching, sweeping, gating, and pulse generators; study of multivibrators, negative resistance devices and amplifiers, nonlinear operation of oscillators. Prerequisite: EE 122, 153; or equivalent. (1972–73 and alternate years: fall—evening; 1973–74 and alternate years: fall—day)

226 **Optical Electronics** (3)

Principles of optical systems, aberrations, and optical resonators; quantum theory of radiation, coherence and detection of radiation; lasers, holography, optical (spatial) filtering, and nonlinear optics. Prerequisite: EE 230 or equivalent. (1972–73 and alternate years: spring—evening; 1973–74 and alternate years: spring—day)

227 **Industrial Electronics** (3)

Applications of electronic devices in industry; continuous and sampled control systems; induction and dielectric heating; timing and counting circuits; reliability and automatic checking equipment; digital control of machine tools. Prerequisite: EE 122 or equivalent and graduate status. (Fall—evening)

228 **High-frequency Electronics** (3)

Design and analysis of the operation of electron-tube, solid-state, crossed field, space-charge wave, and quantum maser oscillators and amplifying devices that lay the foundation of modern-day communication systems. Prerequisite: EE 133 or equivalent. (Spring—evening)

229 **Precise Optical Measurements** (3)

(Formerly MeaS 243)

Optical constants of lens systems; aberration; resolving power; illumination in focal plane; image evaluation, magnification, index of refraction, color and color temperature. Prerequisite: graduate status. (Fall—evening)

230 **Electromagnetic Theory** (3)

Brief review of Maxwell's equations, boundary conditions, electromagnetic potentials, Poynting's theorem, generalized orthogonal coordinates, field equivalence theorems; applications to problems involving reflection, refraction, scattering, and diffraction of electromagnetic waves. Prerequisite: EE 32. (Fall—evening)

231 **Field Analysis and Potential Theory** (3)

General study of the theory of potentials as used to facilitate solution of problems in electromagnetic theory, mechanics, thermodynamics, optics, and gravitation. Emphasis on mathematical methods such as Green's functions, variational methods, principal axis transformations, and multidimensional Fourier transforms. Prerequisite: EE 201; EE 133 or 230. (1972–73 and alternate years: fall—evening; 1973–74 and alternate years: fall—day)

232 **Electrodynamics** (3)

Special theory of relativity and the Lorentz transformation; Minkowski formulation. Maxwell's equation in the context of special relativity, electromagnetic potentials, and stress tensors. Lagrangian and Hamiltonian formulation, radiation from moving charges. Introduction to quantum electrodynamics. Prerequisite: EE 201, 230. (1972–73 and alternate years: spring—evening; 1973–74 and alternate years: spring—day)

233 **Microwaves and Components** (3)

High-frequency transmission lines and guided systems; matching techniques; scatter ferrite isolators, gyrators; Faraday rotation; microwave networks; directional couplers; cavity resonators and microwave components. Prerequisite: EE 230. (Fall—evening)

234 **Electromagnetic Wave Propagation** (3)

Retarded time scalar, vector, and Hertz potential. Dipole and dipole array fields; Mie theory of electromagnetic scattering by spheres. Propagation in electrically and magnetically anisotropic media such as dielectric crystals, space-charge plasmas, and ferrites. Wave propagation in inhomogeneous media; Liouville transformation, Lagrange's variation of parameters, WKB solution, invariant imbedding techniques. Propagation in stochastic and dispersive media. Prerequisite: EE 230. (1972–73 and alternate years: spring—day; 1973–74 and alternate years: spring—evening)

235 **Antennas** (3)

General solution of Maxwell's equations in terms of current sources, the far field approximations, radiation from current distributions, field equi

alence theorems, the geometrical optics approximation, aperture antennas, receiving antennas, the theory of arrays, and applications to specific antennas and antenna types. Prerequisite: EE 230. (1972–73 and alternate years: fall—day; 1973–74 and alternate years: fall—evening)

236 **Magnetohydrodynamics** (3)

Study of the interaction of fluids with electromagnetic fields. Generalized Navier-Stokes and energy equations, magnetogasdynamic and magnetohydrodynamic approximations, boundary layer theory, statistical theory of turbulence, generalized Von Karman-Howarth equation, Boltzmann transport equation. MHD generators and devices. Prerequisite: EE 230. (Spring—evening)

238 **Precise Microwave Measurements** (3)

(Formerly MeaS 242)

Precise measurement of power, frequency, impedance, wavelength, and attenuation at microwave frequencies; characteristics and Q of resonant devices; calibration of microwave components; design of microwave experiments. Prerequisite: EE 230 or equivalent. (Spring—evening)

239 **Precise Electrical Standards** (3)

(Formerly MeaS 244)

Concepts of standards, errors; design of resistance, capacitance and inductance standards; d-c voltage standards; frequency and time standards; dielectric and magnetic materials, attenuation standards, power standards, transfer standards. Prerequisite: EE 160 or equivalent. (Spring—evening)

241 **Information Theory I** (3)

Laws and theorems of probability, statistical measure of uncertainty and information; noiseless coding, communication channels, channel capacity, fundamental theorems of information theory. Prerequisite: EE 201, 204; or equivalent. (1972–73 and alternate years: fall—day; 1973–74 and alternate years: fall—evening)

242 **Information Theory II** (3)

Error-correcting codes, parity-check coding, information sources, channels with memory, Markov chains, continuous channels. Prerequisite: EE 241. (1972–73 and alternate years: spring—day; 1973–74 and alternate years: spring—evening)

243 **Communication Theory I** (3)

Probability, random processes, correlation functions, and power spectra. Output distributions of linear and nonlinear devices with random inputs. Optimum receiver principle, vector channels, optimum receivers for binary and M-ary signals over white Gaussian channels and their error probabilities for different signal sets such as simplex and orthogonal signals. Prerequisite: EE 201, 204; or equivalent. (1972–73 and alternate years: fall—evening; 1973–74 and alternate years: fall—day)

244 **Communication Theory II** (3)

Schemes of efficient signaling for data sequences and their performance analysis. Channel models, filtering, and optimum modulation and demodulation. Signaling over fading channels and their optimum receivers. Diversity transmission and various reception schemes. Prerequisite: EE 243. (1972–73 and alternate years: spring—evening; 1973–74 and alternate years: spring—day)

245 Signal Detection and Estimation Theory (3)

Statistical detection theory, hypothesis testing, sequential detection, es mation theory, maximum likelihood and Bayes methods, estimation signal parameters and continuous wave forms, Wiener and Kalman filter applications to the design of optimum receivers, adaptive systems. Pr requisite: EE 241, 244; or equivalent. (Fall—evening)

246 Digital Communications (3)

Analog-to-digital conversion; the sampling theorem and its implication applications of the Z-transform; optimum codes and optimum decoding schemes; generation of pseudorandom sequences; choice of optimum wa forms; decision theory and optimum detection schemes; sampled data sy tems; digital communication systems. Prerequisite: EE 241, 244; or equi alent. (Spring—evening)

247 Communication Systems (3)

Wiener filters, phase-locked loops and their optimization. Parame estimation theory with application to optimum demodulation of analo wave forms (DSB-AM, SSB-AM, FM). Comparative analysis of analo modulation systems. Digital communication systems—coherent and non coherent reception of binary and M-ary signals and their performance analysis. Frequency acquisition and synchronization. Prerequisite: EE 243. (Fall—evening)

248 Microwave Communication Systems (3)

Analysis and design of microwave communication systems with emphasi on radar, microwave relay, and satellite systems. Prerequisite: EE 143 230. (Spring—evening)

255 Optical Processing (3)

(Formerly Pattern Recognition, Graphics, and Optical Processing)

Fourier transforms by diffraction of light, optical spectrum analysis, opt cal memories and systems, holography and holographic techniques, prop erties and techniques for photographic reproduction. Prerequisite: EE 201 (Fall—evening)

271 Automatic Control in State Space Setting (3)

State space formulation of continuous systems, simulation diagrams, trans fer function matrices, matrix representation of state equations, controllabil ity and observability, the state transition matrix, stability analysis, methods of Liapunov. Prerequisite: EE 172 or permission of instructor. (1972–73 and alternate years: fall—day; 1973–74 and alternate years: fall—evening)

272 Digital Control Systems (3)

Sampling processes and theorems; stability criteria, Z-transforms, modified Z-transforms, and responses of sampled-data systems; state variables for discrete systems; examples of practical digital computer control systems; synthesis and design of sampled-data control systems; nonlinear sampled-data control systems. Prerequisite: EE 271 or equivalent. (1972–73 and alternate years: spring—day; 1973–74 and alternate years: spring—evening)

273 Optimal Programming and Control (3)

Optimization theory. Calculus of variations; Euler's equation, fixed and variable endpoint conditions, boundary value problems, equality con-

straints, and Lagrange multipliers. Performance indices and penalty functions. The maximum principle and the Hamilton-Jacobi equation. Properties of optimal systems. Functional equations techniques of dynamic programming. Prerequisite: EE 271 or equivalent. (1972–73 and alternate years: fall—evening; 1973–74 and alternate years: fall—day)

274 **Nonlinear Control Systems** (3)

Definition of linear and nonlinear systems. Phase portraits and limit cycles. First-order approximation or describing functions; Tsypkin's locus. Lipschitz's conditions; method of Krylov and Bogolinbov. Stability criteria: Liapunov's, Popov's, and Lur's methods. Nonlinear systems with time-varying parameters; switching systems; nonlinear programming optimization. Prerequisite: EE 273. (1972–73 and alternate years: spring—evening; 1973–74 and alternate years: spring—day)

275 **Stochastic Processes in Automatic Control** (3)

Analysis of effects of time-invariant linear control systems on stationary random processes. The optimal filtering problem based on the maximum principle. Iterative parameter estimation using matrix inversion lemma. Analysis and control of multivariable systems in the presence of various disturbances. Stochastic stability. Statistical analysis of nonlinear systems—stationary and nonstationary states. Prerequisite: EE 271 or equivalent. (Fall—evening)

276 **Cybernetics** (3)

Principles of machines or mechanisms made by men or nature with regard to their ways and forms of possible behaviors: regular, determinate, or reproducible; fundamental concepts of finite differences; changes and transformations as sets of transitions, leading to stability and feedback; statistical concepts of complex systems and blackbox theory; Shannon's information theory; regulation and control of mechanisms. Prerequisite: graduate status and Ap S 115 or equivalent. (Spring—evening)

277 **Space Communication Systems** (3)

Theoretical and application aspects of space communications, as related to communication satellite systems, scientific satellites, manned space missions, and deep space missions. Prerequisite: graduate status. (Fall—evening)

278 **Spacecraft Systems Design** (3)

Space environment; structure, propulsion, control, and instrumentation of spacecraft—launch, orbit, transit, and re-entry problems; bioastronautic considerations. Prerequisite: graduate status. (Spring—evening)

281 **Electronic Measurements in Medicine** (3)

Theory of measurements in biological areas, techniques for electronic measurements on biological specimens, current problems in medical metrology stressing electronic systems. Prerequisite: EE 283 or permission of instructor. (Fall—evening)

282 **Instrumentation in Medical Electronics** (3)

Medical telemetry systems, medical use of the computer, engineering techniques in patient treatment, principles of good medical instrumentation. Prerequisite: EE 283 or permission of instructor. (Spring—evening)

283 Introduction to Medicine for Engineers I (3)

Designed to acquaint the engineering student with the physiology of the human body: material based on the curriculum of the School of Medicine and taught from a systems viewpoint; concepts of cellular structure and function integrated into the tissue and organs, which are then related to the various systems of the body; interrelationships of the body systems, i.e., the interaction of the nervous system with the musculoskeletal system or the interaction of the respiratory system and its functions with the cardiovascular system. (Fall—day)

284 Introduction to Medicine for Engineers II (3)

Clinical aspects of medicine. Further elaboration of physiological systems, such as the endocrine system, renal physiology, gastrointestinal physiology, and others; the separate systems of the body are integrated to present the functioning of the body as an over-all system; considerations interaction with physicians and other medical personnel. Prerequisite: EE 283. (Spring—day)

285 Engineering in Vocational Medicine and Rehabilitation (3)

Application of engineering theory and techniques to the rehabilitation of handicapped persons: major problem areas and general approaches, as well as specific solutions. Offered cooperatively with personnel from the Social and Rehabilitation Services Administration. Prerequisite: EE 284. (Spring—evening)

298 Research (arr.)

Research as arranged. May be repeated for credit. (Fall and spring)

299–300 Thesis Research (3–3)

(Fall and spring)

319 Networks Research (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

323 Principles of Microelectronics (3)

Vacuum techniques; thin film deposition and components; masking; thin film active devices. Thick films and hybrid circuits. Properties of semiconductors; solid state chemistry. Junction formation; epitaxy, masking and device formation. Prerequisite: EE 222 or equivalent. (Fall—evening)

325 Principles of Lasers (3)

Basic concepts from quantum mechanics: Einstein coefficients; inversion and pumping mechanisms; laser rate equations. Resonators, He-Ne laser; organic dye lasers; injection lasers. Nonlinear interactions in lasers. Prerequisite: EE 221 or equivalent. (Fall—evening)

329 Electronics Research (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

339 Fields and Waves Research (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

349 Communications Research (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

371 **Simulation Methods for System Analysis** (3)

Survey of simulation languages. Techniques of model building for material- and machine-based systems. Treatment of these systems with notion of transactions and states. Modeling the dynamic processes of growth problems. Analog, hybrid, and digital methods for simulation treated by means of case studies; speed and cost of alternate computing procedures. Project-type problems used to illustrate simulation methods. Prerequisite: CS 278 or permission of instructor. (Fall—evening)

372 **Analysis and Control of Large Systems** (3)

Systems as multistage decision processes. Analytical concepts of model-making and matrix representation for computer mechanization. Recursive digital computer algorithm for economy in storage and computing time. System identification. Adaptive control systems. Prerequisite: EE 273 or equivalent. (Spring—evening)

379 **Controls and Systems Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

389 **Medical Engineering Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)

Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)

UTER SCIENCE COURSES

215 **Computer Graphics and Pattern Recognition** (3)

Graphical data processing and display systems; software systems needed for graphical I/0; digital and analog display methods; scanning, sampling, digitizing, and transmission of data; concept analysis; linear and area transforms; geometry, topology, and syntax of pictures; resolution analysis; signal-to-noise problems; transformations, projections, and the hidden-line problems. Prerequisite: EE 157 or equivalent and permission of instructor. (Fall—evening)

216 **Information Retrieval Systems** (3)
(Formerly EE 252)

Information organization and retrieval of natural language data by digital computer systems; statistical, syntactic, and logical analysis of natural language used for retrieval systems; dictionary systems including thesaurus look-up and phrase structures; searching strategies and cataloguing. Input preparation and output structures; large-scale file structures and operating systems required for their use. Prerequisite: EE 157 or equivalent. (Spring—evening)

231 **Finite State Machines** (3)
(Formerly EE 253)

Analysis and design of sequential networks, state diagrams, flow table, equivalence of states, races, transition maps, output tables, hazards, synchronous and asynchronous sequential networks. State assignment problem, partitions, partition pairs, information flow inequalities, clocks,

state realizations, parallel and serial decompositions, machine networks and decompositions. State identification. Prerequisite: EE 153. (Pr —evening)

232 **Finite Automata** (3)
(Formerly EE 254)

Effectively computable functions, recursive functions, regular expressions, single and multiple tape Turing machines, probabilistic automata, neural nets, reliability of automata, artificial intelligence, learning machines, threshold logic, adaptability, pushdown automata. Prerequisite: CS 231 or 237. (Spring—evening)

237 **Computing Systems** (3)
(Formerly EE 251)

Organization of large digital computer systems. Design of high-speed arithmetic units. Random access and associative memories; rotational storage devices; computer control and interrupt structures. Input-output channels and interfacing problems. Communications in digital computers. Introduction to multiple access and time-sharing systems. Prerequisite: EE 154. (1972–73 and alternate years: fall—evening; 1973–74 and alternate years: fall—day)

238 **Advanced Computing Systems** (3)
(Formerly EE 352)

Multiple access computer systems, multiprogramming, multiprocessing and time-sharing. Real-time computation; man-machine communication problems, and remote I/O devices. Memory allocation and protection. Secondary storage organization and retrieval. Effects of storage on program operation. Design of file structures. Analytical time-sharing models, scheduling schemes, and user response time. Prerequisite: CS 237. (Spring—evening)

240 **Theory and Practice of Microprogramming** (3)
(Formerly EE 354)

Basic concepts, techniques, and theory of microprogramming as applied to the implementation of control systems for sequential machines. Microprogramming languages, assemblers, and hardware simulators, including specific applications of these to the design of current computer systems and their interfaces with real-time systems. Prerequisite: CS 237, 263. (Spring—evening)

263 **Digital Computer Programming Systems** (3)
(Formerly EE 257)

Introduction to the design of computer software and software systems. Design of assemblers and monitor systems. Communication between components of systems. Design of loaders, input-output control systems, and utility systems. Prerequisite: EE 157 or permission of instructor. (1972–73 and alternate years: fall—day; 1973–74 and alternate years: fall—evening)

264 **Design of Compilers and High-level Languages** (3)
(Formerly EE 258)

Design of high-level, problem-oriented languages. Grammar, syntax, semantics, and pragmatics as they affect the design of translators and compilers. Context-free languages, pushdown lists, polish-string notation, and additional programming methods used in the construction of compilers and translators. Prerequisite: CS 263 or permission of instructor.

(1972–73 and alternate years: spring—day; 1973–74 and alternate years: spring—evening)

265 **Systems Programming** (3)
(Formerly EE 259)

Batch processing software systems and their limitations; multiprogramming in fixed and variable partitions; data bases and table-driven software; use of list processing in systems programming; multiprocessor systems and fail-soft systems; I/O processing for remote batch and on-line time-sharing systems; introduction to the computer as a utility; real-time programming in a multiprogram environment; system subprograms as reentrant and recursive code. Prerequisite: CS 263 or equivalent.
(Fall—evening)

278 **Analog and Hybrid Computers** (3)
(Formerly EE 256)

Analog computer components and electronics. Slow analog computer solutions of linear and nonlinear differential equations. System simulation and modeling on the analog computer. Introduction to the iterative analog computer. Transfer function simulation and use in control theory. The hybrid computer, digital logic and digital computer control. Digital-to-analog and analog-to-digital converters and interfaces. Optimization methods on a hybrid computer. Parameter variations and searching methods. Prerequisite or concurrent registration: EE 154 or permission of instructor. (1972–73 and alternate years: spring—evening; 1973–74 and alternate years: spring—day)

284 **Applications of Numerical Methods** (3)
(Formerly EE 250)

Numerical methods in scientific and engineering problems; development of computer algorithms for the solution of numerical problems; error analysis and sensitivities of numerical methods; use of a procedural computer language in the solution of numerical methods; computer methods for simultaneous equations, interpolation, differentiation and quadrature. solution of ordinary differential equations, boundary value problems, partial differential equations, and linear algebra. Prerequisite: EE 51 or equivalent and permission of instructor. (Spring—evening)

298 **Research** (arr.)

Research as arranged. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)

(Fall and spring)

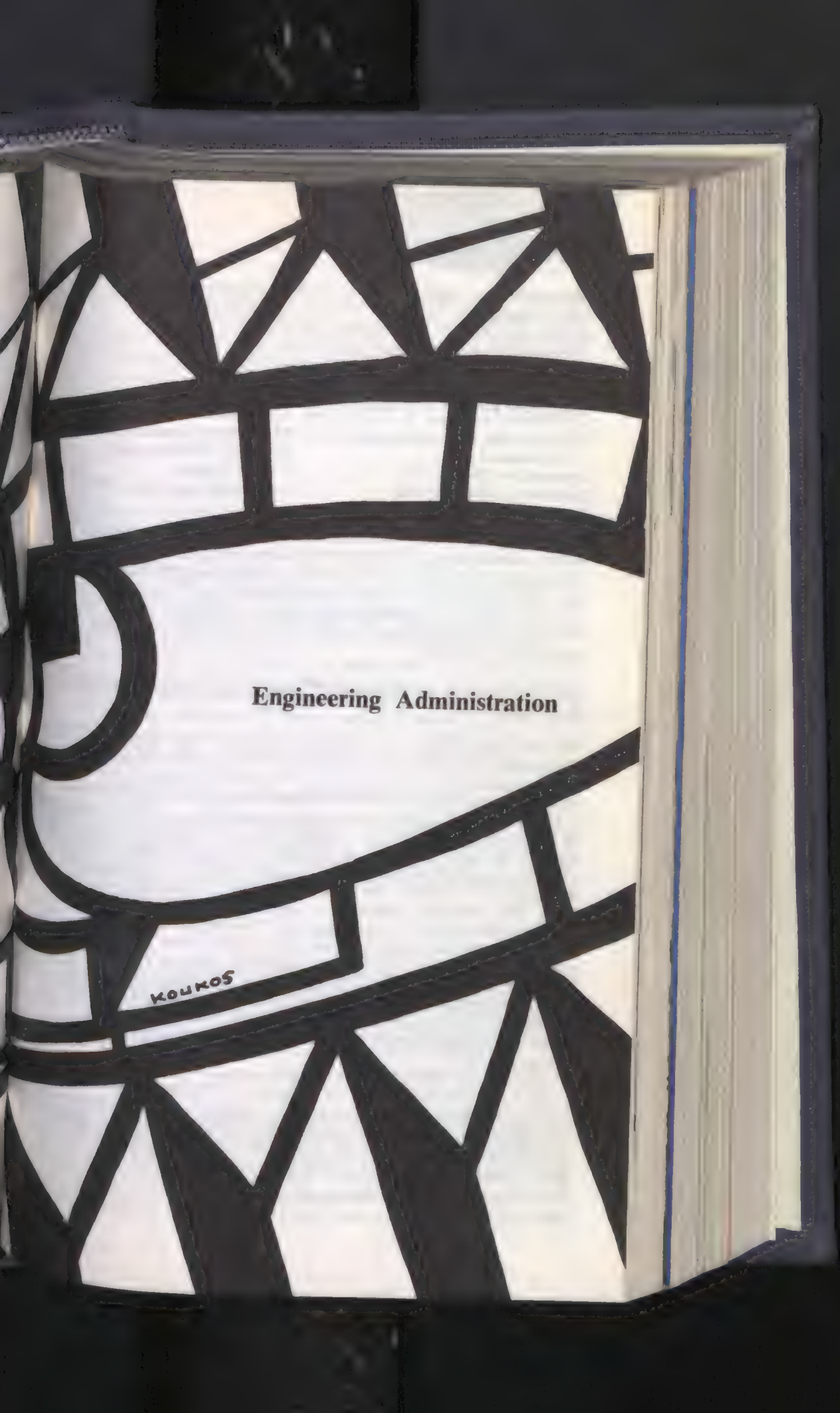
391 **Computer Science Research** (arr.)
(Formerly EE 359)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)

Limited to Doctor of Science candidates. May be repeated for credit.
(Fall and spring)




Engineering Administration
KOUKOS

Engineering Administration*

Professors P.A. Crafton *(Chairman)*, H.E. Smith, P.S. Shane, John Kaye, K
neth Johnson
Professorial Lecturers G.W. Shelhorse, D.P. Boyd
Associate Professor J.B. Smith, Jr.
Associate Professorial Lecturers L.S. Rotolo, D.H. Jermain

GRADUATE FIELDS AND AREAS OF CONCENTRATION

Administration of Research and Development
Construction Management
Engineering Administration
Environmental Management
Management Information Systems
Marketing of Technology
Systems Analysis
Technology and Public Affairs

Programs in Engineering Administration lead to the degrees of Master of En neering Administration and Doctor of Science. Programs in Administration Research and Development, Construction Management, Environmental Manag ment, Management Information Systems, Marketing of Technology, and Tec nology and Public Affairs lead to the degree of Master of Engineering Admi istration. Programs in Systems Analysis lead to the degrees of Master of Scien and Doctor of Science.

THE MASTER OF ENGINEERING ADMINISTRATION DEGREE PROGRAM

The principal objective of the program leading to the degree of Master o Engineering Administration is to prepare students whose undergraduate back ground training was in engineering, mathematics, or science for positions o managerial responsibility in industry, government, or the armed services.

The program is designed to help the student achieve a broad understandin of the administrative process. Although years of experience are required to develop the skills, insight, and maturity of judgment which distinguish an effective manager in technical and scientific enterprises, a graduate professional management curriculum can give the student an effective start as a man- ager. The curriculum provides an opportunity for the student to gain an understanding and to develop some useful managerial skills in the functional areas of engineering administration. One of the major purposes is to assist the student in forming the habit of examining problems from an over-all ad- ministrative point of view. The individual's own particular experience, and the explicit process of relating this experience to the theoretical structure which he starts to build in graduate study, provides each student with a personal frame of reference through which he may interpret management in a rapidly changing world.

Successful education for engineering administration implies a clear statement of what it is that an engineering manager must do, an analysis of the broad functions involved in management, and a detailing of modern methods useful in making and executing decisions in the management of technological and scientific organizations. It is the aim of the School, therefore, to keep alive a spirit of general inquiry and a problem-solving orientation.

* Staff of instruction for the academic year 1971–72.

The management of technical enterprise is one of the most difficult challenges of our times. The professional engineering manager today must understand not only the currently developing technologies but also the rapidly changing marketplace where these technologies are applied for society's benefit. The engineering administrator is the link between these dynamic technologies and the needs of society in general.

In summary, the program of study has for its objective an educational experience which will contribute to the development of managers possessing a combination of technical know-how and administrative skill.

ADMISSION

In addition to the requirements for admission to graduate study (see pages 22–23) applicants for programs leading to the degree of Master of Engineering Administration must have an adequate knowledge of the principles of human relations, the fundamentals of finance and accounting, and the fundamentals of quantitative methods. This requirement can be met by satisfactory completion of the following undergraduate courses or approved equivalents: Acct 115, *Survey of Financial Accounting;* E Ad 170, *Basic Quantitative Methods for Engineering Administration;* and Psyc 145, *Psychology of Management.* A student is required to earn the grade of *C* or better (unless the requirement is stipulated to be a grade of *B* or better upon his admission) in each undergraduate prerequisite course. If this scholarship requirement is not met the student is barred from further enrollment. A student is not permitted to repeat any of the undergraduate prerequisite courses. Credit for prerequisite courses is not applicable toward the degree of Master of Engineering Administration.

ADMINISTRATION OF RESEARCH AND DEVELOPMENT

The objective of the program of study in the field of Administration of Research and Development is to prepare students for responsible managerial positions in organizations conducting technological or scientific research and development and in organizations planning and administering programs of technological or scientific research and development.

REQUIRED COURSES

A program of study consisting of a sequence of courses is prescribed for each student in conference with an adviser. Students are required to complete E Ad 211–12, 255, 269, 295, and 299–300 (for those electing the thesis program) or 297 (for those not electing a thesis); the remainder of the program is selected from courses in the Department of Engineering Administration.

CONSTRUCTION MANAGEMENT

Construction Management encompasses those managerial functions in an organization that plans and executes major construction work. This can take place in the field, in the project office, or in a main office. Due to the inherent complexity of present-day engineering, engineers need to know management as well as basic planning, design, and construction methods. They need to know construction developments, problems of contracts and specifications, techniques of

scheduling and control, estimating, labor relations, and industrial or manag ment psychology.

The objective of the program of study in the field of Construction Manag ment is to prepare the engineer for the task of marshalling men, materials, ma chines, and money against time, cost, weather, and human nature to plan an build structures.

REQUIRED COURSES

Students are required to complete E Ad 211–12, 241, 242, 269, and 299–300 (for those electing a thesis) or 297 (for those not electing a thesis); the re mainder of the program is selected, with the approval of the student's adviser from courses in the Department of Engineering Administration, the Department of Civil, Mechanical, and Environmental Engineering, and other departments of the University.

ENGINEERING ADMINISTRATION

Study in engineering administration provides the conceptual depth in manage ment practice and knowledge needed by technical and scientific personnel who are confronted with increasing demands and mounting complexities. Technical knowledge is complemented by an understanding of theory and practice in management action. Engineering management is a logical development of a technological society. The program of study is designed to provide engineers with a knowledge of and proficiency in the administration of engineering and science. It emphasizes use of deliberative, purposive study of general administrative problems and opportunities, as well as the study and use of specific knowledge and methods needed to solve administrative problems and to explore opportunities.

REQUIRED COURSES

Analysis, case study, and quantitative approaches are emphasized in addition to technical reviews of administration. A program of study consisting of an integrated sequence of courses is prescribed for each student in conference with an adviser. Students are required to complete E Ad 211–12, 269, and 299–300 (for those electing a thesis) or 297 (for those not electing a thesis); the remainder of the program is elective. E Ad 211–12 and 269 must be taken prior to the elective courses, except that in certain cases permission may be obtained for concurrent registration. Electives are chosen from the Department of Engineering Administration and other departments of the University, but no more than two courses may be chosen from other departments.

ENVIRONMENTAL MANAGEMENT

The objective of the program of study in the field of Environmental Management is to prepare students for responsible managerial positions in organizations conducting environmental control and in organizations planning and administering programs in the prevention and control of environmental pollution.

REQUIRED COURSES

Students are required to complete E Ad 211–12, 221–22, 261, 269, and 299–

300 (for those electing a thesis) or 297 (for those not electing a thesis); the remainder of the program is selected, with the approval of the student's adviser, from appropriate courses in the Department of Engineering Administration, the Department of Civil, Mechanical, and Environmental Engineering, and other departments of the University.

MANAGEMENT INFORMATION SYSTEMS

The objective of the program of study in the field of Management Information Systems is to provide the developing manager in technological and scientific organizations with the understanding and competence in the managerial use of systems that furnish quickly to management information in the variety of forms that are required for day-to-day operations and long-range decisions.

REQUIRED COURSES

Students are required to complete E Ad 211–12, 269, 295, 321, and 299–300 (for those electing a thesis) or 297 (for those not electing a thesis); the remainder of the program is selected from courses in the Department of Engineering Administration, and, with the approval of the student's adviser, in other departments of the University.

MARKETING OF TECHNOLOGY

As the American economy matures and American citizens survey the broad spectrum of options available to them, it is apparent that scientific and engineering outputs must be sold in world-wide competition both at home and abroad. The trained specialist is becoming more important than ever before in performing the selling function.

The objective of the program of study in the field of Marketing of Technology is to prepare students for responsible positions in marketing technical products and services.

REQUIRED COURSES

Students are required to complete E Ad 211–12, 269, 293, 294, 311, and 299–300 (for those electing a thesis) or 297 (for those not electing a thesis); the remainder of the program is selected from courses in the Department of Engineering Administration.

TECHNOLOGY AND PUBLIC AFFAIRS

The objective of the program of study in the field of Technology and Public Affairs is to prepare students for responsible positions requiring managerial decision-making on matters that involve the impact of technology on public policy and that concern the general interrelationship between modern technology and public affairs.

REQUIRED COURSES

Students are required to complete E Ad 211–12, 269, and 299–300 (for those electing a thesis) or 297 (for those not electing a thesis); the remainder of the program is selected, with the approval of the student's adviser, from courses in

the Department of Engineering Administration, the National Law Center, other departments of the University.

THE MASTER OF SCIENCE DEGREE PROGRAM

SYSTEMS ANALYSIS

The program of study in the field of Systems Analysis leads to the degree Master of Science and is administered by the Department of Engineering A ministration.

The objective of this program is to prepare students whose undergradu background training was in engineering, mathematics, or science for respo sible positions in the practice of systems analysis.

ADMISSION

The admission requirement for the Master of Science degree in the field o Systems Analysis is a Bachelor's degree in engineering, mathematics, or th sciences from a recognized institution.

REQUIRED COURSES

Students are required to complete E Ad 281, 282, 283, 284, and 299–30 (equivalent to 6 semester hours for those electing a thesis) or 9 semester hour of approved courses in lieu of E Ad 299–300. The remainder of the prograr is selected, with the approval of the student's adviser, from courses in the De partment of Engineering Administration and other departments of the Un versity.

DOCTORAL STUDY

Programs in Engineering Administration and in Systems Analysis leading to the degree of Doctor of Science provide advanced study and research to en able gifted students to extend their fields of knowledge and to enhance their career opportunities in research analysis, management, administration, or edu cation.

ADMISSION TO DOCTORAL STUDY

In addition to the general requirements for admission to doctoral study (see page 26), applicants must have a Master's degree, with a superior record of academic achievements, in engineering, science, or mathematics. Outstanding professional performance is also considered in evaluating applicants.

PROGRAMS OF STUDY

Major fields leading to the degree of Doctor of Science are available in both Engineering Administration and Systems Analysis. In addition to the major field, two minor areas of concentration are normally required, which may be chosen from the areas administered by this Department or from appropriate areas available in other departments of the University. The general require ments for doctoral study are stated on pages 27–30.

COURSES

UNDERGRADUATE

170 **Basic Quantitative Methods for Engineering Administration** (3)

An introductory treatment of quantitative tools and techniques important in administration, with emphasis on their application. Concepts of probability and decision-making in administrative decisions. (Fall and spring)

GRADUATE

204 **Administration of Engineering Contracts** (3)

Study of the total contracting process, including initial budget preparation and justification, actions leading to the execution of a contract, and administration of the contract to completion; considered from the viewpoints of the industrial and government buyer and the seller of technical materials and services. (Fall and spring)

207 **The Personnel Function for Engineering Administrators** (3)
(Formerly Personnel Administration)

Principles of managing human talent, the most vital resource in engineering or research; emphasis on principles, theory, and practical considerations of the personnel function for engineering managers, with practical applications in an engineering administration environment. (Fall and spring)

210 **Engineering Law** (3)

Legal principles and procedures of interest to engineers, the American legal system, contracts and specifications, liability of professional engineers, antitrust problems, agency relationships, negotiable instruments, patent and proprietary rights, special problems in research and developmental contracts. (Fall and spring)

211–12 **Engineering Administration** (3–3)

Comprehensive and systematic study of the administrative process with emphasis on industrial, scientific, and engineering environments. Planning: objectives, prediction, policies, plans and characteristics of plans. Organizing: theory of organization, structure, authority, specialization, delegation, staff and committees. Directing: leadership, managing human and material resources. Controlling: setting standards, evaluating performance, using system feedback data for correction and improvement.
(E Ad 211 and 212—fall and spring)

213 **Case Analysis in Engineering Administration** (3)

Written analysis and class discussion of cases involving application of the principles of engineering administration and use of the scientific method. (1972–73 and alternate years: fall)

221–22 **Environmental Management** (3–3)

Integration of social, technical, economic, and political forces which shape environment; review of government programs to combat air, water, solid waste, noise, and thermal pollution; conducting and analyzing a regional ecology system; legal aspects of environmental management; economic and technological impacts of environmental policies; effects of chemicals on ecology. Systematic waste management; social, political, and economic reactions to environmental policies. (Academic year)

241 Construction Management I (3)

Contract negotiations; aspects of contracts and specifications important to management. Construction estimating and cost allocation in heavy and building construction; budgeting and accounting concepts. (Fall)

242 Construction Management II (3)

Construction administration: organization, construction planning, and scheduling. Industrial relations and human factors in construction management, work measurement, programming and progressing, project management and control. (Spring)

243 Construction Management III (3)

Managerial problems associated with advanced methods of construction and equipment; trend of mechanization; equipment policy and depreciation.

253 Production Management (3)

Planning, organizing, and control of production; forecasting techniques; material management; methods of loading and scheduling production processes; electronic methods in production control. Organization and administration of the plant engineering function with emphasis on maintenance control programs. Prerequisite: E Ad 269 or permission of instructor. (Spring)

254 Automatic Data Processing Systems (3)

Logic of computers, arithmetic and control units, systems analysis for data processing applications, systems design, systems economics, relation to scientific decision processes. (Fall and spring)

255 Administration of Research and Development (3)

Study of contemporary practices of administrators of scientific and engineering research and development; the relation of these studies to accepted managerial concepts, and their effect on contemporary managerial hierarchies and organizational structures. (Fall and spring)

261 Economic Analysis in Engineering Planning (3)

Important concepts and theories employed in economic analysis of engineering projects. Application of various analytical processes. Detailed practice in pursuit of solutions to, and adjustment of, persistent and current problems in this field. Prerequisite: E Ad 269 or permission of instructor. (Fall and spring)

269 Elements of Decision-making and Problem-solving (3)

History and orientation of quantitative methods; concept of quantitative decision-making; decision criteria under certainty, risk, and uncertainty; game theory; utility; the time factor; replacement models. Prerequisite E Ad 170 or equivalent. (Fall and spring)

281–82 Systems Analysis and Management (3–3)

Systems analysis as applied to management, especially the planning function. Properties, nature, structure, and organization of systems; conceptualization of the total system. Operational functioning and description of systems. Objectives, alternatives, models, criteria, and feedback as analytical considerations. Enterprises, input-output structure of the U.S. economy and organizations from the systems point of view. Case analyses. (Academic year)

283 **Systems Engineering I** (3)

Concept of system structure and organization. Linear and nonlinear systems analysis; dynamics and stability of systems. Introduction to optimization methods. (Fall)

284 **Systems Engineering II** (3)

Design of systems; simulation and modeling of systems; adaptive systems; system optimization. (Spring)

285 **Seminar: Administrative Problems** (3)

Individual analysis of complex administrative problems, with group evaluation and discussion. Prerequisite: 18 semester hours of graduate credit. (Fall and spring)

293 **Technical Enterprises** (3)

Essential features of technology-based companies; basic issues of planning, organizing, financing, and managing a new venture from the entrepreneur's point of view; case studies and a detailed plan for a venture. Designed for those within technical firms and those within government who depend on technical firms as suppliers. (Fall)

294 **Marketing of Technology I** (3)

Marketing of industrial goods and high-technology projects; emphasis on the federal government as the customer. Products, channels, organization, selling, technical service, and control; case analyses. (Spring)

295 **Management of Technical Information** (3)

Needs and objectives of technical information systems, functions involved in technical information, storage and retrieval, abstracting, computer usage in technical information systems, system organization. (Spring)

297 **Problems in Engineering Administration** (3)

Project course providing the student with the opportunity to apply the various concepts and tools previously studied to the solution of a problem in engineering administration. Students work individually or in small groups, each on a problem proposed by the student and approved by the instructor. (Fall and spring)

298 **Research** (arr.)

Basic or applied research in engineering administration. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)

(Fall and spring)

311 **Marketing of Technology II** (3)

Continuation of E Ad 294. Special attention to marketing research, negotiation, and international marketing. Required for Master's degree candidates in the Marketing of Technology program. Prerequisite: E Ad 294.

321 **Management Information Systems** (3)

Study and development of information systems used by middle and higher management of technological and scientific organizations in the control of many facets of the organization at all managerial levels. Required for Master's degree candidates in the Management Information Systems program. (Fall)

386 Advanced Topics in Management (3)

Reading and discussion of classic and important recent literature concer
ing the philosophy and application of management principles. (Fa

387 Technological Forecasting (3)

Concepts and methodology: normative and exploratory forecasting,
source allocation and forecasting, technology transfer, technological cha
and its effects on forecasting, technology assessment. (Spring)

388 Cost Effectiveness (3)

Concepts of evaluation of engineered systems, current methods and trend
in methodology, system resource requirements, probability and decisio
theory in cost effectiveness studies, systems approach to cost effectiveness
studies. (1972–73 and alternate years: fall)

398 Advanced Reading and Research (arr.)

Limited to students preparing for the Doctor of Science qualifying exam
nation. May be repeated for credit. (Fall and spring)

399 Dissertation Research (arr.)

Limited to Doctor of Science candidates. May be repeated for credit.
(Fall and spring)






Operations
Research

Operations Research*

Professor W. H. Marlow *(Chairman)*
Adjunct Professor Avraham Hermoni
Associate Professors Donald Gross, N.D. Singpurwalla, C.M. Harris, J.E. Falk *(Research)*, A.V. Fiacco *(Research)*, G.P. McCormick *(Research)*
Associate Professorial Lecturers Victor Selman, Charles Anello, John Waller
Assistant Professor C.E. Pinkus
Assistant Professorial Lecturer P.D. Robers

Programs in Operations Research lead to the degrees of Master of Science and Doctor of Science.

MASTER'S STUDY

The objective of the program in Operations Research is to prepare students with appropriate undergraduate backgrounds for study in depth of analytically oriented techniques of management decision-making and their applications.

Expanded scientific, statistical, and mathematical knowledge, combined with growing needs in technological as well as social areas, have created increased demands for individuals trained in operations research. The discipline of operations research uses scientific principles supported by statistical and mathematical methodology to study the function and structure of complex technical, industrial, military, and social systems in an effort to evaluate the probable effects of proposed courses of action, to establish criteria to judge the effectiveness of these courses, and to assist in the making of optimal decisions. The program in Operations Research provides a scientific basis for solving problems involving the interaction of many factors and organizational components in the interests of the whole or total problem. This breadth of interest is an example of the "systems approach" in the sense that a system is an interconnected complex of functionally related components. Most operations research efforts begin with specific aspects of the general problem in such a way that it is possible to proceed to consideration of the system as a whole. Just as the engineer may start with the study of subsystems or components of a general problem, so may the operations research analyst.

ADMISSION

In addition to the requirements for admission to graduate study (see pages 22–23), the applicant for the program in Operations Research leading to the degree of Master of Science must have an adequate knowledge of probability and statistics. This requirement can be met by satisfactory completion of the following undergraduate courses or approved equivalents: Ap S 115, *Probabilistic and Statistical Methods in Engineering;* Stat 191, *Probabilistic Methods for Operations Research;* and Stat 192, *Statistical Methods for Operations Research.*

REQUIRED COURSES

Core courses required in the field of Operations Research are OR 201, 202, 209, 210, and 299–300 (for those electing a thesis) or 291 (for those not electing a thesis). Students must complete OR 201, 202, 209, and 210 before attempting

* Staff of instruction for the academic year 1971–72.

other courses; however, in certain cases, permission may be granted for current registration. Students electing OR 291 normally complete this course the last semester of the program. The remainder of the program is selected, th the approval of the adviser, generally in an area of concentration from urses in the Department of Operations Research. Appropriate courses from her departments of the University may also be approved as electives.

EAS OF CONCENTRATION

e philosophy of the Department of Operations Research is to provide pro- ams flexible enough to accommodate those whose interests lie in applications d those whose interests lie in theory. Examples of areas of concentration llow:

nagement Science

OR 232: Applications of Linear and Nonlinear Optimization Theory
OR 251: Linear Programming
OR 261: Theory of Games
OR 271: Forecasting Techniques
OR 273: Digital Systems Simulation
OR 279: Inventory Control

th the approval of the adviser, courses may be elected from the departments of siness Administration, Economics, Engineering Administration, and Management ence.

thematical Modeling in Information Systems

OR 251: Linear Programming
OR 271: Forecasting Techniques
OR 273: Digital Systems Simulation
OR 277: Queuing Theory

th the approval of the adviser, courses may be elected from the departments of ectrical Engineering and Computer Science and Management Science.

thematical Optimization

OR 251: Linear Programming
OR 252: Nonlinear and Dynamic Programming
OR 261: Theory of Games
OR 275: Introduction to Scheduling

th the approval of the adviser, courses may be elected from Applied Science and Department of Mathematics.

del Building for Transportation Flows

OR 231: Theory of Traffic Flow
OR 232: Applications of Linear and Nonlinear Optimization Theory
OR 251: Linear Programming
OR 252: Nonlinear and Dynamic Programming
OR 273: Digital Systems Simulation
OR 277: Queuing Theory
OR 281: Reliability Theory I

With the approval of the adviser, courses may be elected from the departments of Civil, Mechanical, and Environmental Engineering; Engineering Administration; Urban and Regional Planning; and from the National Law Center.

Operations Research in Industrial Engineering Systems

OR 232: Applications of Linear and Nonlinear Optimization Theory
OR 251: Linear Programming
OR 252: Nonlinear and Dynamic Programming
OR 271: Forecasting Techniques
OR 273: Digital Systems Simulation
OR 275: Introduction to Scheduling
OR 277: Queuing Theory
OR 279: Inventory Control
OR 281: Reliability Theory I

Quantitative Decision-making for Public Policy

OR 232: Applications of Linear and Nonlinear Optimization Theory
OR 251: Linear Programming
OR 261: Theory of Games
OR 271: Forecasting Techniques
OR 273: Digital Systems Simulation

With the approval of the adviser, courses may be elected from the departments of Civil, Mechanical, and Environmental Engineering; Economics; Public Administration; and Urban and Regional Planning.

Stochastic Modeling

OR 271: Forecasting Techniques
OR 273: Digital Systems Simulation
OR 277: Queuing Theory
OR 279: Inventory Control
OR 281: Reliability Theory I

With the approval of the adviser, courses may be elected from the Department of Statistics.

DOCTORAL STUDY

Programs in Operations Research leading to the degree of Doctor of Science provide advanced study and research to enable the student to extend his field of knowledge and to enhance his career opportunities in research, analysis, management, administration, or education.

ADMISSION

In addition to the general requirements for admission to doctoral study (see page 26), the applicant for the doctoral program in Operations Research must have a Master's degree, with a superior record of academic achievement. Outstanding professional performance is also considered in evaluating applicants.

OGRAMS OF STUDY

octoral programs are planned so that the student may obtain an adequate adth in operations research and sufficient depth in areas of specialization to rmit him to complete a dissertation which will be a significant contribution to e field. Possible areas of concentration include mathematical programming, ventory, queuing, reliability, and traffic theory. In addition to the major in erations Research, two minor areas of concentration are normally required. e minor area must be in Applied Science, Mathematics, or Statistics. The cond minor area may be chosen from appropriate areas available in other partments of the University, such as Business Administration; Civil, Mechan-, and Environmental Engineering; Economics; Electrical Engineering and mputer Science; Engineering Administration; Health Care Administration; nagement Science; Mathematics; and Urban and Regional Planning. The neral requirements for doctoral study are stated on pages 27–30.

CONVERSION TABLE FOR RENUMBERING ENGINEERING ADMINISTRATION AND OPERATIONS RESEARCH COURSES

Previous Number	New Number	Previous Number	New Number
E Ad 115	Ap S 115	E Ad 280	OR 202
E Ad 270	OR 201	E Ad 286	OR 271
E Ad 272	OR 291	E Ad 287	OR 273
E Ad 273	OR 209	E Ad 288	OR 231
E Ad 274	OR 210	E Ad 296	OR 281
E Ad 275	OR 251	E Ad 376	OR 361
E Ad 276	OR 261	E Ad 377	OR 377
E Ad 277	OR 277	E Ad 378	OR 351
E Ad 278	OR 252	E Ad 396	OR 381
E Ad 279	OR 279	E Ad 397	OR 397

GRADUATE COURSES

201 Survey of Operations Research Methods I (3)

(Formerly E Ad 270)

Basic concepts and techniques of operations research as applied to problems in industrial, governmental, and military decision-making. Allocation models including the simplex procedure of linear programming, transportation and assignment models, queuing theory, inventory theory, game theory, and decision-making under uncertainty. Prerequisite: Ap S 115 or equivalent. (Fall and spring)

202 Survey of Operations Research Methods II (3)

(Formerly E Ad 280)

Simulation, Monte Carlo techniques; networks; integer programming; introduction to nonlinear programming; dynamic programming; Markov chains; reliability and replacement. Prerequisite: OR 201 or equivalent. (Fall and spring)

209 Mathematics for Operations Research I (3)
(Formerly E Ad 273)

Matrix algebra, geometry of spaces, vector spaces, linear transformati and rank, simultaneous linear equations, convex sets, eigenvalue proble solutions of linear ordinary differential equations, and differential di ence equations. (Fall)

210 Mathematics for Operations Research II (3)
(Formerly E Ad 274)

Elements of set theory, sequences and series, limits and continuity, ferentiation, classical optimization techniques; integration, sequences series of functions, functions of several variables; complex analysis, cluding analytic functions, contour integration, conformal mapping, Fourier transforms. (Spring)

231 Theory of Traffic Flow (3)
(Formerly E Ad 288)

Definitions and measurement of traffic stream parameters; dynamic t ories: follow-the-leader models of traffic flow; kinematic theories and flu analogies; traffic cybernetics; statistical distributions and queuing theor stochastic approaches to static delay problems; simulation of traffic prob lems. Prerequisite: Ap S 115 or equivalent. (1972–73 and alterna years: spring)

232 Applications of Linear and Nonlinear Optimization Theory (3)

Introduction to penalty-function and arc methods for solving linear an nonlinear optimization problems through use of existing computer code Formulation of optimization models in application areas of structura design, nutrition, pollution control, resource allocation, biology, ec nomics, psychology, statistics, and chemical processes. Prerequisite: pe mission of instructor. (Fall)

251 Linear Programming (3)
(Formerly E Ad 275)

Basic computational, theoretical, and applied areas with emphasis on th general linear programming problems; simplex procedures; duality prob lems; parametric linear programming and sensitivity analysis, transporta tion problem. (Fall and spring)

252 Nonlinear and Dynamic Programming (3)
(Formerly E Ad 278)

Static and dynamic optimization problems including convex, quadratic and separable programs; network problems; problems in the calculus of variations. Gradient, Lagrangian, and penalty functions techniques. Pre requisite: OR 202 or 251; or permission of instructor. (Spring)

261 Theory of Games (3)
(Formerly E Ad 276)

Study of mathematical models with applications to the relationship among independent competitive entities (persons or organizations in en vironment of competition, bargaining, bidding), selection of optimum strategies, minimax concept, connections with linear programming and decision functions, two-person and n-person zero and nonzero sum games. (Fall)

271 **Forecasting Techniques** (3)
(Formerly E Ad 286)

Regression analysis and its use as a forecasting tool; uses and limitations of time series analysis in forecasting; business indicators and index numbers. Introduction to spectral theory: correlogram, periodogram, and spectral density. Prerequisite: Ap S 115 or equivalent. (1973–74 and alternate years: spring)

273 **Digital Systems Simulation** (3)
(Formerly E Ad 287)

Monte Carlo techniques, random number and random deviate generation, variance reducing techniques; operational gaming; Monte Carlo applications in inventory, queuing, and production scheduling. Prerequisite: Ap S 115 or equivalent and knowledge of FORTRAN. (1972–73 and alternate years: spring)

275 **Introduction to Scheduling** (3)

Theory of scheduling, with emphasis on industrial applications; assembly line balancing; sequencing and scheduling of jobs in machine shops. Mathematical optimization, heuristic programming, and computer simulation approaches to these problems are examined. Prerequisite: OR 202, or permission of instructor. (1972–73 and alternate years: fall)

277 **Queuing Theory** (3)
(Formerly E Ad 277)

Study and analysis of waiting line systems, birth and death processes, arrival and service patterns, single- and multi-channel systems, variations in queuing disciplines. Prerequisite: Ap S 115 or equivalent. (Spring)

279 **Inventory Control** (3)
(Formerly E Ad 279)

Application of mathematical techniques to decisions regarding when and how much to produce or purchase, control of production and inventory systems, various mathematical models of inventory systems with deterministic and stochastic demands, forecasting demand, interaction of production and inventory systems, simulation models. Prerequisite: Ap S 115 or equivalent. (Fall)

281 **Reliability Theory I** (3)
(Formerly E Ad 296)

Review of estimation procedures, regularity conditions for maximum likelihood estimators, limit theorems, order statistics, and extreme value theory; probabilistic derivation of failure models from hazard-rate and renewal-theoretic considerations; topics in censored, truncated, and accelerated life tests for exponential and extremal types of distributions emphasizing linear and minimum-risk invariant estimators; sequential analysis and sequential life testing in both classical and Bayesian frameworks; nonparametric characterization of failure distributions and mathematical properties of failure-rate functions. Prerequisite: Stat 191, 192; or equivalent. (Fall)

291 **Problems in Operations Research** (3)
(Formerly E Ad 272)

Field experience in operations research on a team basis. Each small group locates an actual problem and formulates solution by operations research models. Class evaluation of progress. (Spring)

298 **Research** (arr.)

Basic or applied research in operations research. May be repeated for credit. (Fall and spring)

299–300 **Thesis Research** (3–3)

(Fall and spring)

351 **Advanced Topics in Mathematical Programming** (3)
(Formerly E Ad 378)

Integer programming, branch-and-bound techniques, networks, linear programming under uncertainty. Prerequisite: OR 251, 252; or permission of instructor. (1973–74 and alternate years: fall)

361 **Games, Decisions, and Value Theory** (3)
(Formerly E Ad 376)

General structure of statistical games: concepts of utility and optimal strategies, the invariance principle, sequential decision processes, Bayes procedures in games. Principles of value theory: measurement of relative values, metagames, and the dominance principle. Prerequisite: OR 261, Stat 192; or permission of instructor. (1972–73 and alternate years: spring)

377 **Advanced Stochastic Models in Operations Research** (3)
(Formerly E Ad 377)

Selected topics in advanced queuing theory, including transient solutions, busy periods, and waiting times. Additional birth-death theory, imbedded Markov chains, fluctuation and renewal theory. Selected topics in advanced inventory theory, including conditions for optimality of (s, S) policies, stochastic lead-time problems, state-dependent lead times, multi-stage and multi-echelon problems. Prerequisite: OR 277, 279; or permission of instructor. (1972–73 and alternate years: fall)

381 **Reliability Theory II** (3)
(Formerly E Ad 396)

Nonparametric methods in reliability: increasing failure rate (IFR) and decreasing failure rate (DFR) characterizations of failure distributions, tests for IFR, DFR, and "U-shaped" distributions. Coherent structures, classes of distributions preserved under coherent structures, bounds on system reliability using modular decomposition. Drenick's theorem, preservation of monotone failure rates. Replacement: comparison of random age, and block replacement policies. Repairman problems. Redundancy optimization and allocation of redundancy. Prerequisite: Stat 192 and permission of instructor. (1973–74 and alternate years: spring)

396 **Seminar: Operations Research** (arr.)

(Fall or spring)

397 **Advanced Topics in Operations Research** (3)
(Formerly E Ad 397)

Advanced topics from the literature of operations research for analysis, presentation, and discussion. Reading assignments from the professional journals selected by the instructor and the student. (Fall or spring)

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Science qualifying examination. May be repeated for credit. (Fall and spring)

399 **Dissertation Research** (arr.)
Limited to Doctor of Science candidates. May be repeated for credit. (Fall and spring)

Required Courses in Engineering Undergraduate Curricula Offered by Columbian College of Arts and Sciences

convenience, descriptions of required courses in undergraduate curricula ch are offered by Columbian College of Arts and Sciences are listed here. the *Undergraduate and Graduate Catalogue* for elective courses in the anities and social sciences.

MISTRY

13 **General Chemistry** (4)
Lecture (3 hours), laboratory (3 hours), recitation (1 hour). Atomic structure, chemical bonding; chemical equations; acids and bases; chemical equilibrium; liquid and solid states; periodicity; electrochemistry; organic chemistry. Prerequisite: Math 31, Phys 2. Laboratory fee, $18. (Fall)

GLISH

*1 **English Composition: Language as Communication** (3)
Study and practice of expository techniques; emphasis on the rhetorical complexities of unity, development, organization, and coherence, by analysis of selected current books; library research procedure. (Fall and spring)

*1x **English Composition: Language as Communication** (3)
Intensive course in English grammar and composition for students inadequately prepared for Engl 1. Begins with detailed instruction, drill, and exercises in basic structure of the English language and in writing paragraphs; continues with content of Engl 1. Engl 1x meets five hours a week and carries 3 semester hours of credit. Total fee, $265 (tuition fee of $240 plus additional fee of $25). (Fall and spring)

OLOGY

136 **Engineering Geology** (3)
Geological principles and processes and their application to civil and mechanical engineering. Prerequisite: Math 31, Phys 2; or permission of instructor. (Spring)

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dents whose College Board English Composition Achievement Test scores suggest inadequate paration may be assigned to Engl 1x or may be tested in vocabulary, spelling, grammar, standusage, and writing skill, before placement in either Engl 1x or 1. Students whose scores and/ writing skill indicate superior competence will be allowed to waive the Engl 1 requirement.

MATHEMATICS

30 Precalculus (3)

Set theory, inequalities, basic analytic geometry, functions and re
Polynomial, trigonometric, logarithmic, and exponential functions
requisite: Math 3 and 6; or one and one-half years of high school a
one year of high school geometry, and one-half year of high school
nometry; or equivalent. Prior to registration, new students should
placement examination in algebra and trigonometry. (Fall and sp

31 Calculus of One Variable (3)

Differentiation and integration of algebraic and elementary transcend
functions, with simple applications. Prerequisite: Math 30* or equiv
(Fall and spring)

32 Calculus of Several Variables (3)

Partial derivatives, multiple integrals, infinite series. Prerequisite:
31. (Fall and spring)

PHYSICS

1 General Physics (4)

Topics in classical physics which form a foundation for modern phy
Prerequisite: two years of college preparatory mathematics or concur
registration for Math 6. Laboratory fee, $11. (Fall and spring)

2 Introduction to Modern Physics (4)

Selected topics in modern physics, including relativity and quantum the
Prerequisite: Phys 1 or equivalent. Laboratory fee, $11. (Fall
spring)

31–32 Introduction to Theoretical Physics (2–2)

Theoretical structure of physics, emphasis on appropriate analytical te
niques. Prerequisite: two semesters of calculus and Phys 2. (Acade
year)

51–52 Introduction to Experimental Physics (2–2)

Experiments and lectures on the basic phenomena of physics and te
niques of experimentation. Prerequisite: Phys 2 and two semesters
calculus. Laboratory fee, $11 a semester. (Academic year)

SOCIOLOGY

126 Urban Sociology (3)

Place of the city in larger society; growth of the city, problems of urba
living, group life, personality, urban housing, city planning, and suburba
development. (Fall and spring)

* Math 30 may be waived as a prerequisite by examination on scheduled dates.

GENERAL INFORMATION

Registration

THE DATES, HOURS, AND PLACE OF REGISTRATION will be stated in the *Schedule of Classes*, which is available well in advance of each semester.

A student cannot register for classes until he has received a letter of admission to the University issued by the appropriate admitting office.

No registration is accepted for less than a semester or one summer session.

A student may not register concurrently in this University and another institution without the prior permission of the dean of the college, school, or division in which he is registered in this University. Registration in more than one college, school, or division of the University requires the written permission of the deans concerned, *prior to registration*. Allowance of credit for work done concurrently at another institution is at the discretion of the appropriate committee.

ELIGIBILITY FOR REGISTRATION

Registration for the following categories of campus students is held on the days of registration stated in the University Calendar. A student who is suspended or whose record is not clear for any reason is not eligible to register.

New Student.—Upon receipt of a letter of admission, the new student is eligible for registration on the stated days of registration.

Readmitted Student.—A student previously registered in the University who was not registered for campus courses during the preceding semester or summer session must apply for and receive a letter of readmission from the appropriate admitting office before he is eligible for registration. A student registered for the spring semester of 1972 need not apply for readmission for the fall semester 1972. Such a student is a "Continuing Student."

Continuing Student.—The student registered for campus courses in the immediately preceding semester of the academic year is eligible to register upon presentation of his student identification card from the previous semester. The student registered for the 1972 Summer Sessions campus courses, and not restricted to summer registration, is eligible to register for the 1972 fall semester on presentation of his 1972 Summer Sessions student identification card.

REGISTRATION CHANGES AND WITHDRAWALS (see pages 130–31, 137)

Fees and Financial Regulations

FEES PAID BY STUDENTS cover only a portion of the cost of the operation of the University. Income from endowment funds, grants, and gifts from alumni and friends of the institution make up the difference.

The following fees and financial regulations were adopted for the academic year 1972–73. (See pages 128–29 for projected tuition increases for 1973–76.)

Tuition Fees

For undergraduate study:

Full-time program (12 or more hours a semester)	$1,125.00
*Part-time program, for each semester hour	82.00

For graduate study† (except for those students registered before July 1, 1967, who wish to continue payments in accordance with the plan (see below) in effect prior to that date):

*For each semester hour for which the student registers	82.00

Doctoral students not enrolled under the payment plan in effect before July 1, 1967, are required to register for minimum hour-loads.‡ as follows:

1. Full-time doctoral students must register for a minimum of 12 semester hours a semester until 24 hours of work have been completed beyond the qualifying examination; and a minimum of 4 semester hours a semester thereafter until the satisfactory completion of the final examination.
2. Part-time doctoral students must register for a minimum of 6 semester hours a semester until 24 hours of work have been completed beyond the qualifying examination; and for a minimum of 4 semester hours a semester thereafter until the satisfactory completion of the final examination.

For candidates for Master's degrees registered prior to July 1, 1967, who wish to continue payments according to the plan in effect prior to that date:

Total fee, including the Master's Comprehensive Examinations§	2,250.00

* For courses offered in colleges and schools of the University other than the School of Engineering and Applied Science and the National Law Center the fee for each semester hour is $80.00.

† Registration in thesis courses (299–300) entitles the student, during such registration, to the advice of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished an additional semester will be granted, requiring payment of a "continuous registration" fee (see page 128). If the preparation of the thesis extends beyond the three-semester period, approval for this extension will be required and the student must repeat the thesis course 300 and pay tuition as for a repeated course, provided the over-all time limit for earning the degree is not exceeded.

‡ No minimum hour-load is required during the summer sessions.

§ Students completing payment of the total fee before completion of the required work (including thesis and comprehensive examinations) will be granted registration on a "continuous registration—no charge" basis for one semester immediately following the semester in which tuition payment is completed.

Students requiring additional time for completion of required work after completion of payment of the total fee and the expiration of a semester "continuous registration—no charge" must register each semester and pay the normal "continuous registration" fee. See page 139 for regulation governing Military Leave.

r students registered for the degree of Doctor of Science prior to July 1, 67, who wish to continue payments according to the plan in effect prior that date:

For work leading to and including the qualifying examination* $2,200.00
For work leading to and including the final examination* 2,200.00

versity Center Fee (charged all students registered on campus,† nonrefundable)

r students registered for 11 or more semester hours on campus:
Each semester 37.50

r students registered for less than 11 semester hours in a semester on mpus:
For each semester hour for which the student registers 3.50

r students maintaining "continuous registration" status:
Each semester 3.50

ditional Course Fees

certain courses additional fees, such as laboratory and material fees, are charged. se fees are charged by the semester and, unless otherwise indicated, may be de- ed in two payments when the tuition is paid in this manner. Breakage of aterials is charged against the individual student. When breakage is in excess of normal amount provided for in the laboratory fee the individual student will be uired to pay such additional charges as are determined by the department con- ed.

aduation Fees

chelor's, Master's, Doctor's degrees $25.00

e for Binding Master's Thesis 10.00

for Microfilm Service and Printing Announcement of Final amination for the Doctoral Degree 60.00

sidence Hall Fees (see page 147).

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the tuition for the first stage is paid in full at the beginning of the first stage of the doctoral cipline, the candidate is entitled to five successive semesters on a "continuous registration—no ge" basis. If still more time is needed, the student must maintain continuous registration and the continuous registration fee.

the tuition is paid in four installments at the rate of $550.00 a semester at the beginning of first stage of the doctoral discipline, no continuous registration fee will be charged if a third is needed for completion of the first stage of the degree requirements. If still more time is ded, the student must maintain continuous registration and pay the continuous registration fee. the tuition is paid in six installments at the rate of $366.66 a semester and if still more time is ded, the student must maintain continuous registration and pay the continuous registration fee.

the tuition for the second stage is paid in full at the beginning of the second stage of the doc- discipline, the candidate is entitled to three successive semesters on a "continuous registration charge" basis. If still more time is needed, the student must maintain continuous registration pay the continuous registration fee.

the tuition is paid in two installments at the rate of $1,100.00 a semester at the beginning of second stage of the doctoral discipline, no continuous registration fee will be charged if a sec- year is needed for completion of this stage of the discipline. If the tuition is paid in four in- llments at the rate of $550.00 a semester at the beginning of the second stage and still more e is needed, the student must maintain continuous registration and pay the continuous regis- ion fee.

dents in off-campus programs are charged the University Center Fee only when registered for ses on campus.

Special Fees

Application fee (degree candidates), nonrefundable.....
Tuition deposit, nonrefundable, charged each entering or readmitted full-time undergraduate student .....
Application for room reservation, nonrefundable, charged each resident student .....
Admission tests (when required).....6.00–
Late-registration fee, for failure to register within the designated period....
Late payment fee, charged for failure to make payments when due (see "Payment of Fees," page 129) .....
Financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," page 129).....
Returned check fee, charged a student whose check is returned because of insufficient funds or improper drafting.....
Continuous registration fee, to maintain "continuous registration" status during any semester of absence from the University or after completion of tuition requirements*—due and payable on the official days of registration .....
Engineers' Council fee, charged each student in the School of Engineering and Applied Science for each semester or any part thereof except the summer term .....
Special Columbian College of Arts and Sciences departmental examination for each course to qualify for receiving credit (advanced standing), waiver of requirement, or both.....
For each examination to qualify for advanced standing and for each special examination .....
English test for foreign students (when required).....
Laboratory checkout fee, for failure to check out of Chemistry laboratory by the date deadline set by the instructor†.....
Transcript fee, for each transcript of record.....

Registration for on-campus courses in the University entitles each student the following University privileges: (1) the services of the Student and Alum Career Services Office; (2) the use of the University Library; (3) gymnasi privileges; (4) admission to all athletic contests, unless otherwise specified; subscription to the *University Hatchet*, the student newspaper; (6) admission University debates; (7) medical attention as described under Student Hea Service. These privileges terminate when the student withdraws or is dismiss from the University.

PROJECTED TUITION INCREASES 1973–76

In order that students and their parents may plan more realistically for a to four-year period, tuition increases for the academic years 1973–74, 1974–7 and 1975–76 have been estimated as follows:

Increase by year (full-time undergraduate students):	
1973–74	$150.0
1974–75	100.0
1975–76	100.0

* Payment of the continuous registration fee entitles the student to return and continue his wo toward a degree under the academic requirements which were in force at the time of his fi registration. The continuous registration fee applies toward neither tuition fee nor residen requirements for the degree (See also footnotes on pages 126 and 127.)

See page 139 for regulation governing Military Leave.

† A student who drops a chemistry course before the end of the semester must check out of th laboratory at the next regular laboratory period.

Increase by semester hour (graduate and part-time undergraduate students) for Engineering and Applied Science courses:

1973–74	$6.00
1974–75	4.00
1975–76	4.00

Every effort will be made to keep tuition increases within the above limits. However, it is not possible to project future economic data with certainty, and circumstances may require an adjustment in these estimates.

PAYMENT OF FEES

No student is permitted to complete registration or attend classes until all charges are paid. Tuition and fees for each semester are due and payable in full at the Office of the Cashier at the time of each registration. Checks and postal money orders should be made out to George Washington University.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. A student registered for six semester hours or more may sign a deferred payment contract with the Student Accounts Office at the time of each registration permitting him to pay one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half on or before November 1, 1972 (for the fall semester), and March 7, 1973 (for the spring semester). Interest at the rate of eight per cent per annum on the unpaid balance will be charged from the date of registration to the date payment is made. The University will not obligate itself to notify the student, in advance, of the payment-due date for the second half of the semester charges.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to sign deferred payment contracts unless the total tuition and fee charges exceed the value of the tuition awards by $500 or more. Under such circumstances the student may be permitted to pay one-half of the amount due from the student at the time of registration and to defer the balance by signing a deferred payment contract.

Students who fail to make any payment when due will be automatically charged a $15 late payment fee. Accounts which become 30 days past due will be financially encumbered and will be subject to the interest charge of eight per cent per annum. In the event a student's account is financially encumbered, the student forfeits his rights to the use of deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $35.

Students auditing courses are subject to all fees charged to students registered for credit.

Because many parents may wish some option in meeting and financing all or part of the cost of a college education, the University offers educational loan plans through the Girard Bank in Philadelphia, Pennsylvania; Funds for Education, Inc., Manchester, New Hampshire; and The Riggs National Bank, Washington, D.C.

Although similar in purpose, these plans vary somewhat in coverage and conditions. One-year and multiple-year plans are available. Insurance covering the life and health of the sponsor is provided through these plans.

Individuals over twenty-one years of age who are employed full-time are eligible to apply. They may sponsor their own contracts, provided they meet the conditions specified by the plan for which they are applying.

Brochures and applications describing these plans are available in the Office of Student Financial Aid.

WITHDRAWALS AND REFUNDS

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean of the School. Notification to an instructor is not an acceptable notice (see "Withdrawal," page 137).

Refunds are granted only during the fall and spring semesters; no refunds are granted during the summer sessions. In authorized withdrawals, changes in schedule, cancellations of semester tuition charges and fees will be made in accordance with the following schedule:

1. *Complete withdrawal* from the University:

   Fall Semester

Withdrawal dated on or before September 15, 1972	90 per cent
Withdrawal dated September 18 to September 29, 1972	75 per cent
Withdrawal dated October 2 to October 13, 1972	50 per cent
Withdrawal dated after October 13, 1972	none

   Spring Semester

Withdrawal dated on or before January 19, 1973	90 per cent
Withdrawal dated January 22 to February 2, 1973	75 per cent
Withdrawal dated February 5 to February 16, 1973	50 per cent
Withdrawal dated after February 16, 1973	none

2. For a *change in status from full-time to part-time student* or for *partial withdrawal* by a *part-time student*, the above schedule applies to the difference in charges between the original program and the adjusted program continuing in effect.
3. A student enrolled in a full-time program who drops or adds a course and continues to be in a full-time program will have no financial adjustments or tuition made other than those involving course fees.
4. A student who is granted military leave before completing the semester will receive credits for current charges in accordance with the schedule for complete withdrawal from the University (see No. 1 above). Payments made in excess of the nonrefundable balance will be refunded to the student. The nonrefundable balance will be maintained as a deferred credit for use by the student when he returns to the University (see "Military Leave," page 139).
5. Regulations governing student withdrawals as they relate to residence halls and food service charges are contained in the specific lease arrangements.

In no case will tuition be refunded or reduced because of absence from classes.

Payment applies only to the semester for which a registration charge is incurred, and in no case will this be credited to another semester.

Authorization to withdraw and certification for work done will not be given student who does not have a clear financial record.

Students are encouraged to provide their own cash funds until they can make anking arrangements in the community.

Financial Aid*

FOR UNDERGRADUATE STUDY

THE GEORGE WASHINGTON UNIVERSITY has a program of financial assistance for undergraduate students in the form of scholarships, loans, grants, part-time employment, or any combination of these resources. The University participates in the National Defense Student Loan, Educational Opportunity Grant, and College Work-Study programs. Financial aid is awarded on the basis of the student's scholastic record, financial need, and qualities of leadership and character.

Scholarships are awarded for the academic year.

Applications and supporting credentials for financial aid must be filed by February 1 (entering freshmen), March 1 (enrolled undergraduate or entering transfer students) preceding the academic year of the award for the fall semester, by October 31, for the spring semester; and by May 1, for the summer session†.

Credentials required of all financial aid applicants:

1. *Application for Financial Aid* forms for entering freshmen and transfer students will automatically be forwarded to the student when the Application for Admission has been received and the student indicates he wishes to apply for financial aid. Students presently enrolled in the University may obtain forms upon request, at the Office of Student Financial Aid.

2. *Parents' Confidential Statement* (Code 5246) must be filed by all applicants who are under twenty-five years of age, married or single, dependent on or independent of parental support.

Students who are applying for aid for the academic year or any portion thereof, and those applying for aid for the summer sessions, should file the *Parents' Confidential Statement* with the College Scholarship Service: Box 176, Princeton, N.J. 08540; Box 1925, Berkeley, Calif. 94701; or Box 881, Evanston, Ill. 60204 *no later than twenty days prior to* the deadline dates for application (see dates above).

Entering freshmen may obtain *Parents' Confidential Statement* forms at local secondary schools or upon request to the College Scholarship Service. All other applicants may obtain forms, upon request, at the Office of Student Financial Aid.

An undergraduate *transfer* student is not eligible for scholarship funds until he has completed one full semester (15 hours) at this University with a minimum average of *B* (3.00). A transfer student is, however, immediately eligible for other types of financial aid.

* For information concerning financial aid for students from foreign countries, see pages 135-36.

† A Summer Sessions student is eligible for consideration only if he is enrolled in this University for at least 8 semester hours in the immediately preceding spring semester or has applied for financial aid for the following fall semester.

SCHOLARSHIPS

Scholarships are awarded for the academic year unless otherwise specified and are credited in equal parts for each semester. Each holder must carry a full schedule of academic work during the period for which the scholarship is awarded.

Applications should be submitted on or before February 1, for the following academic year and, unless otherwise specified, should be addressed to the Office of Student Financial Aid. Awards are made during the month of April. All scholarships begin with the fall semester.

The following scholarships are limited to students in the School of Engineering and Applied Science. The University offers many others which are open to engineering students. A special bulletin containing a complete list and full information concerning fellowships and scholarships may be obtained from the Office of Student Financial Aid, George Washington University, Washington, D.C. 20006.

Frederick Albert and Alma Hand Britten Scholarships (1959).—Bequest of Alma Hand Britten for scholarship assistance to students entering the School of Engineering and Applied Science who would not otherwise be able to pursue such professional study. Available for undergraduate and graduate study.

Henry Harding Carter Scholarship (1896).—Established by Maria M. Carter in memory of her husband to aid a deserving student who is preparing for the civil engineering profession. Available to students working toward the degree of Bachelor of Science (Civil Engineering).

Henry Parsons Erwin Scholarship (1955).—Established by Helen B. Erwin as a memorial to her husband, a former Trustee of the University. A partial scholarship for a student in Engineering and Applied Science.

Louis E. Giles Memorial Scholarships (1966).—Bequest of Susie E. Giles in honor and memory of her husband for scholarships to undergraduate and graduate students in the School of Engineering and Applied Science requiring financial assistance.

George Washington University Board of Trustees Scholarships.—Full- and partial-tuition undergraduate scholarships which will begin in the fall semester and extend for four successive academic years, provided the holder maintains a *B* average, as well as a high standard of deportment, and continues to be in financial need. Candidates must plan to select a curriculum leading to a Bachelor's degree.

GRANTS

The following funds have been established to meet the special needs of disadvantaged students from the District of Columbia Inner-City and the Washington Metropolitan area.

Educational Opportunity Grants.—Authorized by the Higher Education Act of 1965 and available to undergraduate students with great financial need. The applicant must show academic promise, be accepted for enrollment on a full-time basis, or be a currently enrolled full-time student in good standing. Students may receive Educational Opportunity Grants for each year of their higher education up to four years.

George Washington University's Educational Opportunity Program Tuition Grants (1968).—Designed to offer a four-year college education for as many

istrict of Columbia high school graduates as are qualified and for whom funds d facilities are available. The program is available only to graduates of Dis- of Columbia high schools and/or other qualified District residents. It is ecifically designed to meet the needs of students whose families cannot afford send them to college, as well as those who have unrealized academic potential.

Key Club of Walt Whitman High School, Bethesda, Md., Grant (1968).—tion award for a disadvantaged student with academic promise from the istrict of Columbia.

Marriott Foundation Grant (1968).—Available to a minority group student o is a resident of the District of Columbia or of the Washington metropolitan ea of Virginia and Maryland.

OR GRADUATE STUDY

HOLARSHIPS, FELLOWSHIPS, ASSISTANTSHIPS, TRAINEESHIPS

e George Washington University program of financial assistance for graduate dents includes graduate scholarships, fellowships, assistantships, and loans. plication for admission to graduate study is a prerequisite for consideration. e University participates in the National Defense Student Loan and College ork-Study programs.

Application and correspondence concerning graduate scholarships, fellowps, or assistantships, unless otherwise specified, should be sent directly to the an of the School, and addressed to George Washington University, Washton, D.C. 20006. Unless otherwise specified, application and supporting cre- entials should be submitted not later than March 1 preceding the period for hich the award is made.

A separate application for National Defense Student Loans or the College ork-Study Program must be submitted to the Office of Student Financial Aid April 1 for the following academic year.

Frederick Albert and Alma Hand Britten Scholarships (1959).—See page 132.

Paul H. and Margaret M. deMaine Scholarships (1967).—Full and partial holarships for graduate students whose research involves the use of com- uters. Inquiries should be made to the Director of the Computer Center of e University.

Louis E. Giles Memorial Scholarships (1966).—See page 132.

Phi Delta Gamma Scholarship Endowment Fund (1968).—Established by e Beta Chapter of Phi Delta Gamma, national fraternity for graduate women. or graduate women students.

Graduate Teaching Fellowships.—Available to students in Master's and doctoral programs. Each teaching fellow renders a designated unit of service to s major department of instruction and receives a stipend of up to $2,800 (on 9-month basis), plus tuition and course fees.

National Science Foundation Graduate Fellowships.—Fellowships leading graduate degrees in the mathematical, physical, medical, biological, engineering, and social sciences, and in the history and philosophy of science; providing ition, fees, and a stipend of $2,700 (for 9-month tenure) or $3,600 (for 12-onth tenure). Open to students who have been admitted to graduate status nd who have completed less than one calendar year of graduate study. Applitions should be made to the Fellowship Office, National Research Council, 101 Constitution Avenue, N.W., Washington, D.C. 20418.

National Science Foundation Graduate Traineeships.—Available to stud in sciences. Traineeships include tuition and a stipend of $3,000 (on a month basis). Inquiries and applications should be submitted prior to F ruary 15 to the Graduate School of Arts and Sciences.

Research Assistantships in Operations Research and Related Fields.—Av able to graduates, and to undergraduates on the junior and senior levels, in school of the University. Research Assistants are expected to work 20 ho a week conducting research in support of an established research program, programming or in conducting individual research on an approved resea project. Stipends vary from approximately $3,300 to $6,800, depending on status of the student and the tenure of the appointment (9–12 months). F ther information and applications are available from the Director, Institute Management Science and Engineering, School of Engineering and Appli Science, George Washington University, Washington, D.C. 20006.

Research Scholar Assistantships, GWU—NASA-Langley Program.—See pag 33.

Resident Assistantships (men and women).—Available to graduate studen and seniors in any field of study who are interested in working with the stu dent personnel program in University residence halls. Specific duties vary wit the position, but basically consist of counseling, advising student groups, an administration. Remuneration includes full tuition and a furnished room fo the academic year. All positions are part-time, enabling staff members to en roll as full-time students. Further information may be obtained from the Office of the Dean of Students.

LOAN FUNDS

The following loan funds are available to students in the University in accord ance with the qualifications placed thereon by the donors. Students should direct inquiries to and file applications with the Office of Student Financial Aid Applicants for a National Defense Education Act Student Loan or a United Student Aid Fund Loan must file a *Parents' Confidential Statement* and an *Application for Financial Aid*. Deadline for submitting applications with support ing credentials is February 1 (entering freshmen), March 1 (enrolled under graduate or entering transfer students), April 1 (graduate students) preceding the academic year of the award; October 31, for the spring semester; and May 1, for the summer session*. Application for admission to the University is a prerequisite for consideration.

National Defense Education Act Student Loan Program.—This fund is available to full-time graduate or undergraduate students in good academic standing who are in need of financial assistance. An undergraduate student may borrow for college expenses a sum not exceeding $1,000 a year and, dur ing his entire undergraduate program, a sum not to exceed $5,000. A graduate or professional student may borrow a maximum of $2,500 a year. The total loans made to such a student for all years, including any loans made to him as an undergraduate, may not exceed $10,000.

State Guaranteed Loan Program.—These loans, provided for in Title IV Part B of the Higher Education Act of 1965, are administered by each state. A

* A Summer Sessions student is eligible for consideration only if he is enrolled in this University for at least 8 semester hours in the immediately preceding spring semester or has applied for financial aid for the following fall semester.

student wishing further information should contact the Department of Higher Education in the state in which he is a legal resident.

Warren Stickler Memorial Loan Fund (1966).—A fund established by the Precision Measurements Association as a memorial to Warren Stickler is available to engineering students.

U.S. Loan Program for Cuban Students.—Cuban Nationals, enrolled as full-time students, who are unable to receive support from sources within Cuba because of action by the Cuban Government, may borrow not more than $1,000 a year or $500 for one semester.

United Student Aid Fund Loan.—These loans are available to full-time graduate and undergraduate students who have completed the freshman year and are in need of financial assistance. Students may borrow up to $1,500 a year. The total loans made to a student, including any loans made to him as an undergraduate, may not exceed $7,500. Application must be made and approved through the University by the date deadlines stated on page 134.

John Brewster Willis, Jr., Loan Fund in Mechanical Engineering.—Established by Mrs. William L. Lane as a memorial to her nephew, John Brewster Willis, Jr., available to Mechanical Engineering students (graduate or undergraduate) who are primarily interested in aeronautics.

A number of short-term emergency loan funds are also available at the University. Information concerning these funds is contained in a special bulletin available from the Office of Student Financial Aid.

COLLEGE WORK-STUDY PROGRAM

The Federal College Work-Study Program provides part-time jobs both on and off campus for full-time students with financial need. Applications and information are available at the Office of Student Financial Aid.

STUDENT EMPLOYMENT

The Student and Alumni Career Services Office maintains a registry of both full-time and part-time positions available in the Washington area for undergraduate and graduate students.

After registration, interested students may apply at the Student and Alumni Career Services Office, 2033 G Street, N.W., for interviews and referrals to positions for which they are qualified.

FOREIGN STUDENTS

Undergraduate foreign students with proven financial need who have completed one semester of full-time work (15 hours) at this University with a *B* average (3.00) or better are eligible for consideration for University Board of Trustees Scholarships. Scholarships are awarded in the spring for the following academic year. See instructions for applying for undergraduate financial aid, page 131.

Limited awards for graduate teaching fellowships are the responsibility of the chairman of the department or dean of the school in which the degree is to be earned. Work as a teaching fellow requires excellent knowledge of English—both spoken and written.

Long-term loan funds for undergraduate and graduate foreign students are limited in amount and are available only to those foreign-born persons who have established resident status in the United States through the Immigration and Naturalization Service.

Students who wish to study in the United States should have available sufficient funds to cover expenses for one full year before attempting to enter a college or university. The cost at this University for one academic year (September–May) is approximately $5,000. This estimate includes room and board, tuition, books, clothes, and incidental expenses; no travel, holiday, or medical expenses are included.

Prizes

Norman B. Ames Memorial Award.—Established by many friends of Professor Ames and awarded annually to a graduating senior of the School of Engineering and Applied Science who is nominated by his fellow students as having made significant contributions to the students in the School of Engineering and Applied Science and to the School and University.

Martin Mahler Prize in Materials Testing.—A one-year membership in the American Society for Testing Materials awarded to the upper division or graduate student in engineering who submits the best reports on tests in the materials laboratories course with preference given to prestressed concrete tests.

School of Engineering and Applied Science Distinguished Scholar.—A certificate awarded annually by the Faculty of the School of Engineering and Applied Science to the senior who graduates with the highest scholastic standing. The student's name is engraved on a plaque displayed in Tompkins Hall of Engineering.

Sigma Tau Prize.—A medal awarded annually by Xi Chapter to the freshman in the School of Engineering and Applied Science who maintains the highest scholastic standing in the work of the entire year.

Theta Tau Activities Plaque.—A plaque awarded annually by Gamma Beta Chapter to the senior in the School of Engineering and Applied Science with the most outstanding record in activities for the entire period of his attendance.

Regulations

A STUDENT ENROLLED in the School of Engineering and Applied Science is required to conform to the following regulations.

A student who withdraws or is suspended, or is otherwise absent from the University for one semester or more, may re-enter and continue his work only under the rules and regulations in force at the time of his return.

If a student knowingly makes a false statement or conceals material information on an application for admission, registration card, or any other University document, his registration may be canceled. If such falsification is discovered after the student has established an academic record at the University, he may be subject to dismissal from the University. Such a student will be ineligible (except by special action of the Faculty) for subsequent registration in the University.

ACADEMIC DISHONESTY

Academic dishonesty on the part of any student will result in a disciplinary grade of *F* for the course involved and also may, upon the recommendation of the appropriate dean's council, result in his suspension from the University for a stated period, at the end of which time he may petition for readmission. Upon approval of the Dean's Council, the disciplinary grade of "Failure—Academic Dishonesty" will be recorded for the course involved, and this grade will be employed in the computation of the quality-point index. A student so suspended shall be withdrawn from all other courses except those in which all work has been completed.

CHANGES IN PROGRAM OF STUDIES

A student may not make any changes in his approved program of studies without the approval of the Dean. Requests for change in class registration must be made on a form provided in the School Office.

During the seven days following the first day of classes of a semester, courses may be added to the student's program with the approval of the instructor, the faculty adviser, and the Dean.

Courses may be dropped by undergraduate students without academic penalty only during the fourteen days following the first day of classes, with the approval of the instructor, the student's adviser, and the Dean. Courses may be dropped by graduate students without academic penalty only within the first four weeks of a semester, with the approval of the instructor, the faculty adviser, and the Dean.

WITHDRAWAL

A student who withdraws or is otherwise absent from the University for one semester or more must apply for readmission. If readmitted, he continues his work under the requirements and regulations in force at the time of his readmission.

Applications for withdrawal from the University or for change in class schedule must be made in person or in writing to the Dean of the School. Notification to an instructor is not an acceptable notice.

Withdrawal from a course or from the University, *without academic or financial penalty*, requires the permission of the Dean of the School. Permission to withdraw from the University will not be granted to a student who does not have a clear financial record.

Withdrawal from any course without academic penalty after the fourteenth day following the first day of classes of a semester may be granted by the Dean to undergraduate students only under the following conditions: (1) exceptional circumstances make the request necessary; (2) the request is submitted on the official form for late withdrawal; (3) as of the date of request, the grades in all courses involved are *C* or better. In exceptional circumstances the Dean may authorize withdrawal for graduate students without academic penalty after the first four weeks of a semester. In all cases financial regulations governing withdrawal remain in full effect.

All charges for courses dropped without the approval of the Dean must be met by the student. Reporting the dropping of a course to an instructor does not effect its discontinuance.

CREDIT

Credit toward a degree is given only after registration for and satisfactory pletion of the required work of a course or upon the granting of adva standing. A student who takes a course as an auditor may not take the course later for credit.

On request the Registrar will issue to undergraduate degree candidates a ance sheet showing the amount of work completed and the requirement maining to be met for the degree.

TRANSCRIPTS OF RECORD

Official transcripts of student records are issued by the Registrar on req of the student or former student who has a clear financial record. A fe two dollars is charged for each transcript.

SUMMER SCHOOL CREDIT

A student who plans to attend summer school at another institution and a credit so earned toward graduation from this University must first secure written approval of the Dean. In no event will credit in excess of what m be earned in a similar period in this University be recognized.

CONTINUOUS REGISTRATION

Degree candidates are expected to maintain continuous registration until degree requirements are satisfied. Students who have completed course re tration (including the thesis) maintain continuous registration by paying "continuous registration" fee (see page 128). By failing to register for semester or more, the student breaks his registration and must be readmit The procedure for readmission to the graduate programs is the same as for undergraduates (see pages 15–16). A "Readmitted Student" is required satisfy the academic requirements existing at the time of his readmission.

Students must be registered during the summer if they are taking cours are taking required examinations, are receiving guidance toward theses or sertations, or are expecting to graduate at the end of the Summer Sessions.

GRADUATION REQUIREMENTS

To be recommended by the Faculty for graduation a student must have met admission requirements of the School; completed satisfactorily the scholarsh curriculum, residence, and other requirements for the degree for which he registered; and be free from all indebtedness to the University. Registrati either for course work or on the "continuous registration" fee basis, is requir for the semester or summer session immediately preceding the awarding of degree.

Application for Graduation.—An "Application for Graduation" form m be filed and the appropriate fee paid at the time of registration for the l semester or summer session of the senior or final year.

Students completing degree requirements during the Summer Sessions will awarded diplomas (no formal convocation) September 30, *provided* they ha completed all degree requirements and have applied for graduation as a p of registration for the Summer Sessions.

Attendance and Conduct.—The University reserves the right to refuse to confer a degree upon a candidate whose attendance or conduct has been unsatisfactory.

THE LIBRARY

All students registered in the University have the privilege of using the University Library. Its stacks are open, and all students are welcome to browse at their leisure. The Student Identification Card, issued upon the payment of fees, must be presented when books are borrowed for outside use.

The loan period for most books available for outside circulation is 30 days. A fine of 25 cents is charged for each day a book is overdue. Any book which circulates is subject to recall by the Library if needed for reserve or other use. Reserve books must be used in the reserve reading room when the Library is open, except that they may be withdrawn for overnight use beginning at 8:30 p.m. A fine of 50 cents is charged for each hour or fraction thereof that a reserve book is overdue. Grades of a student are withheld until his library record is clear.

All students using the University Library are expected to be familiar with its detailed regulations, available at any of the Library's service desks.

MILITARY LEAVE

A student called to active duty may be granted military leave for the period of active duty, upon presentation to his Dean of a copy of his orders and a petition for such leave. The maintenance of "continuous registration" is not required of the student on military leave; however, he must apply for readmission to the University well in advance of the semester in which he expects to return. Payments for tuition and fees which are not refunded to the student at the time he is granted military leave will be maintained as a deferred credit for his account and use upon his return to the University.

UNIVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATION

In general, the policy of the University is one of attempting to keep the student's record confidential and out of the hands of those who would use it for other than legitimate reasons. At the same time, the policy must be flexible enough not to hinder the student, the University, or the community in their legitimate endeavors.

No information concerning a student will be released except as noted below:

1. Information such as whether or not the student is currently enrolled; dates of attendance; verification of date and place of birth; degrees earned (if any), date, major field or area of concentration, and honors received; home and local addresses and telephone numbers; school, college, or division of enrollment, and class; verification of signature; name and address of parent or guardian.

2. The issuance of formal transcripts of record to recognized institutions of higher learning; the certification of academic achievement to the various recognized professional associations (law, medicine, engineering, education, etc.).

Additional information will be released only on written authorization from the student, or by court order or subpoena. If a subpoena is served, the stu-

dent whose record is being subpoenaed will be notified and the subpoena be referred to the University's legal counsel.

Government investigative agencies have no inherent right to access to stu files and records. If expressly requested, properly identified representat from federal, state, or local government agencies may be given the informa listed under No. 1 above.

UNIVERSITY POLICY ON SELECTIVE SERVICE INFORMATION

The University notifies draft boards of a student's academic status only w the student requests or authorizes, in writing, that the draft board be notifi An undergraduate student desiring certification for the Selective Service Syst must go to the Registrar's Office and complete the Selective Service Inform tion Card which authorizes the University to notify his draft board of his f time enrollment. It is the student's obligation to complete this card if he wa his draft board to know that he is registered as a full-time student. This card contains the following statement:

> By my signature below, I hereby authorize the University to notify my draft board of my academic status in the University, or of any changes in academic status that occur during this semester.

RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student fro the University, or from any class or classes, whenever, in the interest of t student or the University, the University Administration deems it advisab

RIGHT TO MAKE CHANGES IN PROGRAMS

The right is reserved by the University to make changes in programs witho notice whenever circumstances warrant such changes.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the rig to modify or change requirements, rules, and fees. Such regulations shall g into force whenever the proper authorities may determine.

PROPERTY RESPONSIBILITY

The University is not responsible for the loss of personal property. A "Lost an Found" Office is located on campus in the Safety and Security Office.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 167–69) contains regulations recently approved by th University's Board of Trustees.

Consortium of Universities of the Washington Metropolitan Area, Inc.

THE UNIVERSITIES IN WASHINGTON, D.C.—American University, Catholic University of America, *George Washington University*, Georgetown University, and Howard University—are associated in a Consortium through which they coordinate the use of their respective facilities; Dunbarton College of Holy Cross and Trinity College are associate members of the Consortium. Students in approved programs leading to degrees in any one of these institutions have the opportunity to select from the combined offerings of all the particular courses which best meet their needs.

Participation is limited to campus degree candidates. The following, however, are excluded: students in Canon Law, Dentistry, Medicine, and Theology. Law students are also excluded from participation, except for candidates for the degree of Master of Laws at George Washington University and Georgetown University.

In special courses involving private instruction (as in music or art) or tutorial study, if a special fee is charged, this fee is not covered by the Consortium agreement and must be paid by the individual student to the institution administering the course. Courses offered in Reserve Officer Training Corps programs are excluded.

Students interested in taking courses at an institution other than their own should consult the program announcements of the other institutions. Consortium application forms and instructions are available from the Registrar after the student has obtained his registration packet. In order to participate in the Consortium program (1) the graduate student must obtain the approval of his adviser and should ascertain from the department of the institution where the course is taught whether or not he is eligible for the course and whether there is a space in the class, *or* (2) the undergraduate student must obtain the approval of his adviser and *must* ascertain from the department of the institution where the course is taught whether or not he is eligible for the course and whether there is space in the class. Specific inquiries should be addressed to the Registrar. *A student may not take courses at another institution that are available at his own.* The student registers and pays at his own institution for all Consortium courses.

Air Force Reserve Officers' Training Corps (AFROTC)

THE DEPARTMENT OF AEROSPACE STUDIES at Catholic University of America, under provisions of an agreement between George Washington University and Catholic University, offers a two-year AFROTC program.

The successful completion of the program qualifies the student for a reserve commission in the United States Air Force upon graduation. Exceptionally well-qualified students may receive a Regular Officer appointment. The program is designed to provide education that will develop skills and attitudes vital to the career professional Air Force Officer. Emphasis is placed on qualities of leadership and other attributes essential to progressive advancement into positions of increasing responsibility as commissioned officers in the Air Force.

Full-time students who have two years remaining toward a baccalaureate or graduate degree are eligible to enter the program. Each student must meet

physical and mental standards set by the Air Force. Candidates must complete six weeks of Field Training, conducted by the Air Force at designated bases, during the summer preceding enrollment into the program. A student must have and maintain a quality-point index of 2.00 or its equivalent. Applications must be made *early* in the academic year prior to the one of enrollment in the program, so that all qualification criteria may be met in time for selection consideration in the spring.

The program is offered at Catholic University. At the time of enrollment, a registration fee must be paid. There is no tuition charge. Students in the program receive a monthly retainer fee of $50. Uniforms and textbooks are furnished without cost. Students participating in the Field Training phase are paid at a rate established by the U.S. Government and are also furnished travel to and from the Field Training base.

Interested students should consult the Department of Aerospace Studies, Catholic University of America, Washington, D.C. 20017.

University Computer Center

THE UNIVERSITY COMPUTER CENTER is located on the first floor of Stuart Hall, 2013 G Street, N.W. The facilities of the Center are available for academic purposes to all registered students and to members of the instructional staff. The Center has as its principal mission the provision of a powerful computing system which serves the University in its educational and research endeavors. The Center's programming staff concentrates its efforts in conducting faculty and staff seminars, consulting with users in the preparation of complicated programs, and carrying out computer-oriented research.

The Computer Center equipment consists of an IBM system 360 Model 50 computer (to be replaced by an IBM System 370 Model 145) with large capacity on-line disk storage, a card read/punch, a high-speed line printer, and four tape drives. The principal languages available to the user are FORTRAN IV, COBOL, Programming Language One (PL/I), Assembler Language, and ALGOL. In addition, numerous utility, statistical, data manipulation, and simulation systems and special languages are available in the library of programs. Facilities are available on a first-come, first-served basis for preparation of programs and data.

Computer programming courses are offered by the School of Government and Business Administration, the Department of Statistics, and the School of Engineering and Applied Science. In addition, many other departments offer courses that utilize the computer as a research adjunct to course work.

The Computer Center is normally open 24 hours a day.

The Speech and Hearing Clinic

THE SPEECH AND HEARING CLINIC offers diagnostic and remedial work for children and adults with such communication difficulties as stuttering, lisping, cleft palate speech, and cerebral-palsied speech; and with voice, articulatory, and

hearing problems. Diagnostic and remedial work is also available for persons with nonstandard language usage due to such conditions as hearing loss, brain damage, mental retardation, and environmental factors.

Fees.—The fee for an initial evaluation is $20. Fees for additional specialized testing are dependent on the testing involved. The fees for individual speech or hearing therapy range from $3 to $10 a session. Fees are reduced for full-time students enrolled in the University and for persons receiving group therapy. Fees are payable at the Office of the Cashier.

The Reading Center

THE READING CENTER offers individual diagnostic and corrective services for all levels: primary, elementary, secondary, and adult. In addition, special reading improvement classes are conducted for high school and college students as well as other adults.

A complete diagnosis includes psychological tests; vision, hearing, dominance, and spelling tests; and various types of reading achievement and aptitude tests. Results are interpreted, and a written report is presented in conference with the parents or the individual.

The special reading improvement classes for high school students, college students, and other adults are offered throughout the year at stated intervals. Emphasis is placed on improvement of vocabulary, speed, comprehension, and study skills. Instruction in spelling is also provided as needed. Mechanical aids such as the tachistoscope, rate accelerator, and controlled reader are available for increasing speed of comprehension.

Fees.—The fee for individual diagnosis is $75; for individual instruction, $8 a lesson; for semi-individual instruction, $6 a lesson; for instruction in small groups with common reading difficulties, $5 a lesson. Reading classes (15 two-hour sessions) are offered for adults, $125; for full-time George Washington University students and faculty, $60. All fees are payable in advance at the Office of the Cashier.

Veterans Education

THE OFFICE OF THE REGISTRAR assists students entitled to educational benefits as veterans or war orphans with any problems which may arise concerning their benefits. This Office also processes certification of enrollment and attendance to the Veterans Administration so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or war orphans should consult the Office of the Registrar prior to submitting application to the Veterans Administration. All such students should obtain the instruction sheet issued by the Office of the Registrar, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration, and which includes other information of general interest.

The Veterans Administration is at 2033 M Street, N.W., Washington, D.C. 20421.

Alumni Associations

THE GENERAL ALUMNI ASSOCIATION

THE OBJECTIVES OF THIS ASSOCIATION are to unite the graduates who wish to associate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.

Eligible members are those who have matriculated in any school of the University and who have left the University in good standing, or any person who is or has been a member of the teaching, research, or administrative staff of the University, or of the Board of Trustees of the University. Active members are those who are life members of The George Washington University General Alumni Association or the Alumni Association of any school of the University, or are current contributors to the George Washington University Fund.

The Alumni Office is in Bacon Hall, 2000 H Street, N.W., Washington, D.C. 20006.

All alumni are urged to keep the Alumni Office informed of changes of address or occupation and to supply information with regard to their fellow alumni.

THE ENGINEER ALUMNI ASSOCIATION OF THE GEORGE WASHINGTON UNIVERSITY, INC.

The Engineer Alumni Association was organized in 1936 and incorporated in 1963 to coordinate with the General Alumni Association those activities of primary interest to the engineering alumnus. The objectives of the Association are to provide the link between the graduates and Faculty of the School, to help promote the general welfare of the School of Engineering and Applied Science and of the University, to foster activities of the engineering organizations recognized by the University, and to advance the engineering profession in general.

In 1966 a board of directors, comprised of fifteen elected members of the Association and the Engineers' representatives serving on the Governing Board of the General Alumni Association, was established. The membership of the board of directors was expanded in 1969 to include the Director of Alumni Relations and one representative each from the Faculty of the School and the student body. Five members of the Association are elected each year, prior to the June meeting, to three-year board memberships as listed below:

Term Expiring 1972
John L. Wolfgang, Jr.
Douglas L. Jones
John R. Manning
Delmer C. Ports
Elmer W. Whitlock, Jr.

Term Expiring 1973
Dulaney de Butts
Matthew Flato
William H. Holt
James A. Sinsabaugh
H. Moffette Tharpe, Jr.

Term Expiring 1974
Arthur E. Proctor
John A. LeReche
Raymond P. Morales
Larry O'Callahan
Joseph Widman

al Alumni Association Representatives
nce R. Brown
m H. Holt
rd A. Wareham III

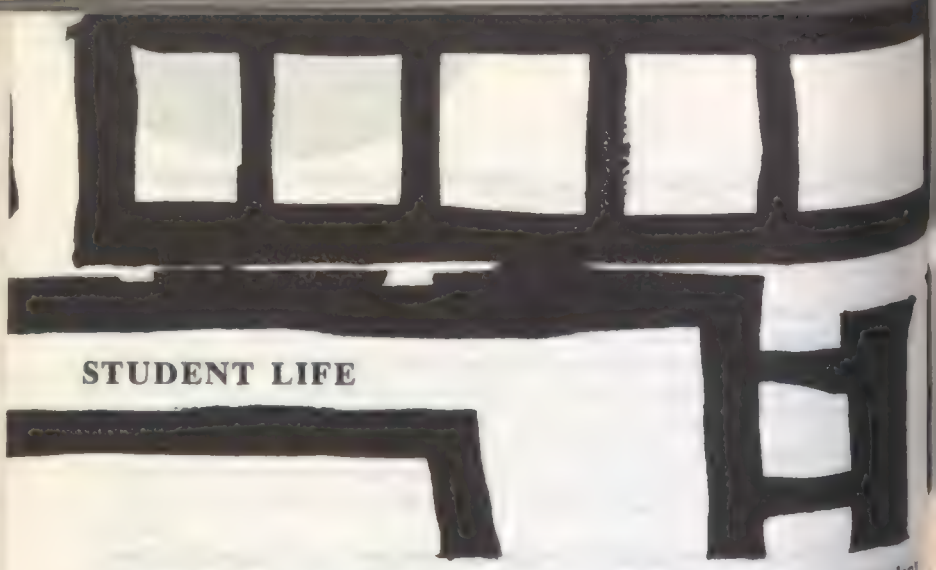
or of Alumni Relations
od A. Smith

y Representative
D. Singpurwalla

nt Representative
rd Kellman

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e June meeting each year the board elects officers for its operation dur-
ne upcoming year. The officers for the years 1971–72 are
dent.—Douglas L. Jones, B.M.E. 1963, M.S. in Engr. 1965, D.Sc. 1970;
00 N. Adams Street, Apt. 232, Arlington, Va. 22201
President.—Arthur E. Proctor, B.E.E. 1953; 10523 Pinewood Court,
elphi, Md. 20783
tary.—John L. Wolfgang, Jr., B.E.E. 1962, M.S. in Engr. 1967; 5600
th Road, Apt. 411, Riverdale, Md. 20840
surer.—John R. Manning, B.S. in Engr. 1957, J.D. 1961; 2774 N. Wake-
ld Street, Arlington, Va. 22207



STUDENT LIFE

THE OFFICE OF THE VICE PRESIDENT FOR STUDENT AFFAIRS develops Student Life programs, policies, and procedures to complement the University's formal instruction program. These activities are implemented through the offices of the Cloyd Heck Marvin Center, Counseling Center, Dean of Students, Educational Opportunity Program, Housing, International Students, Student Activities, Student and Alumni Career Services, and Student Health Service.

STUDENT SERVICES

OFFICE OF THE DEAN OF STUDENTS

The Office of the Dean of Students provides general counseling and information services to individual students. In addition, the staff of this Office is responsible for counseling and other programs within the residence halls. The Dean of Students also works with the Adviser to International Students, the Director of the Counseling Center, the Director of the Educational Opportunity Program, and the Director of Housing in the implementation of their programs.

HOUSING

Complete information concerning the University's residence halls is available from the Director of Housing, George Washington University, Washington, D.C. 20006. Information concerning off-campus housing near the University may be obtained at this Office. The reservation of rooms in private houses must be made by students.

Admission to the University does not include a room reservation. The student will receive, with his notification of acceptance, University residence hall information, an application for residence hall space, a medical examination form, and a declaration of intent to attend the University. The medical examination form must be completed by the applicant and his physician and returned to the Student Health Service Office. The application for residence hall space must be accompanied by a $100 *nonrefundable deposit*. Early decision students *must* submit the deposit by December 15. The housing deposit is credited toward the semester's room charge. Rooms are leased for the academic year, and lease payment must be made by July 15 for the fall semester.

1972–73 Residence Hall Rates per Person for Two Semesters*

For Men:

Adams Hall
double room $750
triple room 700

Calhoun Hall
double room 775
triple room 725

For Women:

Strong Hall
single room 825
double room 775

For Men and Women:

Crawford Hall—double room 725
Finchell Hall—single room 825

Thurston Hall
double room, triple room, large room for four 775
suite for six 725

Graduate Men and Women Only:

Graduate Hall—apartment for three 825
Madison Hall—double room 775

FOOD SERVICE

Resident freshmen and sophomores are required to participate in the food service plan. Freshmen must participate in the seven-day, 20 meals per week plan, at the rate of $680* for the academic year. Sophomores may elect either the 20-meal plan or a five-day meal plan, 15 meals Monday through Friday, for $640* for the academic year. Either plan is optional for junior, senior, and graduate students. Food service payment does not cover University intersession or vacation periods. All meal cards admit bearer to the dining room in Thurston Hall and the second floor contract dining room in the Cloyd Heck Marvin Center.

THURSON HALL APARTMENTS

Thurston Hall is a University-owned and operated apartment house containing 5 one-bedroom and 54 efficiency apartments. Graduate and married students are given priority for residence until July 15 each year. Seniors and juniors who have lived at least one year in University residence halls will be considered for residency after that date if space is available. All leases are for one 12-month year.

EDUCATIONAL OPPORTUNITY PROGRAM

The Educational Opportunity Program is designed to offer a college education primarily to black and other minority students who are graduates of District of Columbia high schools and/or other qualified District residents. It provides an opportunity for a student to seek a degree in almost any field and at the same time receive academic and/or financial assistance.

*Residence Hall and food service prices subject to change.

CLOYD HECK MARVIN CENTER

The Cloyd Heck Marvin Center serves as the campus community center, p
viding services, conveniences, and recreational and social opportunities for s
dents, faculty, staff, alumni, and guests. Its wide range of facilities provi
the setting for a variety of programs conducted by the University Progra
Board; the departments of Drama, Dance, and Music; and other student a
faculty organizations.

A two-board structure, representative of all elements of the University co
munity, plays an important role in the day-to-day functioning of the Cente
The Governing Board and the Operations Board work closely with the fu
time staff in the development of procedures and policies which provide a fram
work for the Center's operation.

STUDENT HEALTH SERVICE

The Student Health Service is an outpatient clinic designed to assist all st
dents registered on campus with their health needs while attending the Unive
sity. This service, located at 935 22nd Street, N.W. (in the H.B. Burns M
morial Building), assists with health conditions and medical emergencies
advice and treatment, proper referral when necessary, and cooperation wi
other physicians and medical facilities.

During the academic year, the hours are 9 a.m. to 10 p.m., Monday throug
Friday, and 9 a.m. to 12 noon on Saturday. The weekday hours during t
summer sessions are from 9 a.m. to 9 p.m.; Saturday hours are 9 a.m. to
noon. A physician is in attendance during these hours.

For serious illnesses or emergencies that occur when the Student Heal
Service is closed, students may call the Medical Bureau (223-2200), or go
the Emergency Room of the University Hospital for treatment. Charges f
both of these services are solely the responsibility of the student.

Charges for services that are not available through the Student Health Ser
ice, such as X-ray and laboratory tests, specialty services, and consultation
etc., must be paid by the student.

The Student Health Service is available only to those students who are cu
rently enrolled on campus in the University. A student who is not current
enrolled, or one who has severed his connection with the University, is ineligib
for this service. This service is not available between the last day of examin
tions for a semester or summer session and the completion of registration f
the next semester or summer session.

A student intending to train for an athletic team is required to pass a med
cal examination. The University is not responsible for injuries received in i
tercollegiate or intramural games, or in any of the activities of the Departme
of Physical Education, Health, and Recreation.

HEALTH AND ACCIDENT INSURANCE

In addition to the above service, the Student Health Service Office has arrange
for Health and Accident Insurance, on an elective basis, for *full-time* student
Arrangements for insurance coverage are the responsibility of the student. Th
University assists in the subscription process by administering application card
and collecting fees during official registration periods.

A student may subscribe and pay for the coverage *only* when he pays h

tuition and other fees at registration. For those few students who register late, the subscription will be available during official late registration. *Subscription during late registration will not be available for those students who previously registered and failed to subscribe at that time.* Students who participate in the Summer Advanced Registration Program must subscribe and pay for the coverage on the appropriate date of the Summer Advanced Registration. Students who participate in the pre-registration, conducted in April for the following Fall Semester, must subscribe for the coverage at the time of pre-registration in April. The fee will be included with the tuition bill and must be paid by August 1.

The fee charged provides coverage on a 6-month basis—September through February for those subscribing for the fall, and March through August for those subscribing for the spring. The coverage is effective, with minor variations (see available folder), whether the student is at the University, at home, or elsewhere. The fee charged at each official registration period will be the payment required for full coverage for a 6-month period and must be paid in full at the time of subscription.

The policy contract is between the individual and the insurance carrier and is accepted at any hospital or emergency room that accepts this type of medical coverage. Details of the policy are contained in a folder available at the Student Health Service Office.

COUNSELING CENTER

The Center offers services to students enrolled in the University which are designed to assist individuals in the diagnosis and treatment of their educational, personal, and social problems; to diagnose problems leading to academic difficulties; to offer vocational counseling and programmed instruction; and to refer individuals to qualified agencies for assistance with problems not handled by the Center. Behavior therapy, individual and group psychotherapy, and individual and group counseling are available.

The Center also provides special assessments including diagnostic measures prescribed by the School of Engineering and Applied Science, admissions tests for the University and for other selected educational institutions, and some selected assessments for business and industry.

Fee: Students who are currently registered as degree candidates in the University are entitled to one interview free of charge. If the student decides to continue to use the services offered, a minimum flat fee of $30 will be charged for short-term treatment. Fees for testing an long-term treatment depend upon the services involved. All fees are payable at the Counseling Center Office.

INTERNATIONAL STUDENTS

International House is the campus center for students from foreign countries. It serves also as the headquarters of the International Students' Society which seeks to promote international friendship and understanding by welcoming to its membership students from all countries, including those from the United States.

The Adviser to International Students has his Office in International House and is available each day throughout the school week for consultation on immigration regulations and on any matters concerning the social and academic welfare of the foreign student.

STUDENT AND ALUMNI CAREER SERVICES OFFICE

The Student and Alumni Career Services Office provides assistance to degr seeking students and alumni seeking full-time, part-time, temporary, or perm nent employment. All students are urged to become acquainted with the servi of this Office early in their college experience.

Counseling concerning trends in employment, areas of employment, varie test and examination announcements, preparation for job interviews, resu writing, and other procedures for successful job application are always ava able. Specific career openings; an on-campus recruitment program by busine industry, government, and school systems; volunteer opportunities; and pa time and temporary jobs for students while attending school are all part of th service. Referral and placement functions of the on-campus College Work-Stu Program are handled by the Student and Alumni Career Services Offi Teacher credential files initiated by persons seeking employment in all educa tional fields are maintained in this Office.

An understanding and knowledgeable approach to avenues of service f those people who do not find career satisfaction in structured systems of bu ness, government, and education is also provided in the Student and Alumn Career Services Office.

RELIGIOUS LIFE

The University recognizes the contribution that religion makes to the life of i students and encourages them to participate in the various religious organiza tions of their own choice. Catholic, Jewish, and Protestant bodies sponso various groups and form a link between the University and the religious com munity. The advisers of the religious organizations are available for counse ing.

Religious services in various traditions are provided regularly for the Univer sity community as announced.

DAVIS-HODGKINS HOUSE

The Davis-Hodgkins House is the student center of the School of Engineerin and Applied Science, providing lounges, reading rooms, and student organiza tion offices. The House provides convenient, comfortable facilities for the ex change of ideas and good fellowship.

STUDENT ACTIVITIES

The offices of the Vice President for Student Affairs, the Dean of Students, the Director of the Cloyd Heck Marvin Center, and the Director of Student Activities are responsible for all co-curricular phases of student life.

STUDENT ACTIVITIES OFFICE

The Student Activities Office assists individual students and organizations in program development, campus leadership training, and participation in special projects—both within the University community and in the community at large. This Office also serves as a central clearinghouse for development and maintenance of a master activities calendar—for registering and assisting campus organizations, for scheduling facilities and events, and for informing the

niversity community of the many activities and programs which can enrich he educational experience. Students interested in participating in the many ocial, cultural, or extracurricular phases of University life should acquaint hemselves with the facilities and functions of the Student Activities Office and s staff.

UNIVERSITY COMMITTEES AND ORGANIZATIONS

The George Washington University is an active, working community where tudent involvement has become a motivating force in the governance of the niversity through the committee structure. This involvement has helped de- elop policies and programs beneficial not only to the student population, but o the total University community. While serving on these committees, student embers are able to participate in the formulation and the application of on- oing institutional policy.

There are numerous committees on which members of the student body are ble to serve. The Student Activities Office has a relatively complete file on ajor committees, and interested students should inquire there for further in- rmation. Additional information is also contained in the *Student Handbook*. brief description of some of these committees follows:

Joint Committee of Faculty and Students.—This administrative committee, reated in response to a resolution of the Faculty Senate, is composed of seven aculty members, seven student members, and other ex officio members. Mem- ers of this Committee are appointed by the President.

The Committee is officially charged to "facilitate all efforts to improve stu- ent-faculty relations," to "encourage student recommendations in all areas of enate policy-formulation which affect student life," and to "recommend changes n the 'Rules and Regulations Governing the Conduct of Student Life.'" The ommittee has specific advisory powers in many areas concerning student- aculty relations and the interests of the student body.

Committee on the Judicial System.—The Committee on the Judicial System s composed of three faculty members and three student members, one of whom s the Chairman of the Student Court, one a student member of the Student- aculty Committee on Appeals, and one selected from the campus at large. he Committee on the Judicial System works closely with the Executive Sec- etary to the Judicial System to make sure that the various hearing bodies are fficiently, fairly, and expeditiously conducting their business.

Other committees include the following: the Committee on University Park- ng; the Committee on Religious Life; the Committee on Sponsored Research; he Committee on Student Publications; and the Committee on the University Bookstore.

THE STUDENT NOMINATING BOARD

This all-student board was created by the President upon the recommendation of the Joint Committee of Faculty and Students in February, 1971. The Board as established "to make appointments to all University Committees that have tudent members where there is no other existing means by or through organi- ational charter or constitution to do so."

The members of the Student Nominating Board are the President of Mortar Board, the President of Omicron Delta Kappa, the Chairman of the Graduate School of Arts and Sciences Student Advisory Council; and one representative

from each of the following: Residence Hall Association, Engineers' Coun Joint Committee of Faculty and Students, Student Bar Association, and As ciation of Medical Students.

THE PROGRAM BOARD

The University Program Board, through its student committee structure a membership, provides a variety of cultural, social, and recreational progra on campus. As a result, students are afforded opportunities to broaden th educational experiences by developing and participating in those progra which contribute to the life of the University community.

Student membership on the Program Board is composed of three executiv officers (Chairman, Vice Chairman, Secretary) elected from the general stude body in the spring semester, and seven committee chairmen appointed aft that election. The seven committees of the Program Board are the Public Re lations Committee, Concert Committee, Community Relations Committee, Pe forming Arts Committee, Visual Arts Committee, Political Affairs Committe and Social Committee. These students work with appointed faculty membe and professional staff from the Division of Student Affairs in carrying o their many programs and activities.

THE ENGINEERS' COUNCIL

The Engineers' Council is the student governing body for the School of Eng neering and Applied Science, composed of elected representatives from eac level class and from the graduate student body, from each student organizatio in the School, the Business Manager of the *Mecheleciv*, and the House Ma ager of the Davis-Hodgkins House. The purpose of the Council is to provid liaison between the student body of the School and the Faculty, Administra tion, and Student Government of the University in all matters affecting th general interests and welfare of the student body, the School, or the Univer sity. The Council is maintained financially by the Engineers' Council fee pai by each student in the School, and sponsors the engineers' student magazine *Mecheleciv;* the Engineers' Mixers; and the Engineers' Ball. Council meeting are open to all students in the School.

The Council acts as the directing body for *Mecheleciv*, which is free to al students in the School. This magazine includes campus and alumni news, a calendar of events, news of the student organizations, and articles on engineer ing by students and faculty members. The magazine is published by a student Board of Editors and a volunteer student staff.

STUDENT ORGANIZATIONS

The following is a representative list of organizations active at the University during 1971–72 of particular interest to students in the School of Engineering and Applied Science. More complete information on these and other organiza tions is available at the Student Activities Office.

FORENSICS AND PERFORMING ARTS

Enosinian Debating Society; George Washington University Dance Company Station WRGW; University Chamber Choir, Chorus, Orchestra: University Players. A variety of programs is presented by these groups.

NOR SOCIETIES

Sigma Xi.—A national scientific honor society, the purpose of which is to ncourage original investigation in science, pure and applied. Outstanding aduate students in the sciences are eligible for full membership, and undergraduates who have shown marked ability in research may be elected to asso-te membership.

Delphi.—An intersorority honorary society.
Delta Sigma Rho-Tau Kappa Alpha.—A national forensic society.
Mortar Board.—A national society for senior college women, stressing lead-rship, scholarship, and service.
Omicron Delta Kappa.—A national fraternity for junior and senior men em-sizing leadership in extracurricular activities.
Phi Eta Sigma.—A national fraternity, established to encourage and reward gh scholarship and attainment, membership in which is limited to those fresh-n men who attain a scholastic average of at least 3.50 or the equivalent.
Sigma Tau.—A national engineering honorary fraternity, the purpose of ich is to recognize scholarship and professional attainment.
Tassels.—A service honorary society for sophomore women.
Tau Beta Pi.—A national engineering honorary fraternity, the purpose of ich is to recognize distinguished scholarship and exemplary character.

TERESTS AND SERVICE ORGANIZATIONS

ack People's Union, Caravansary International, Cheerleaders, Chess Club, cle K, College Republican Club, Committee for an All-University Govern-ent, Freedom Leadership Foundation, Gay Peoples' Association, GW Student ress, GW Women's Liberation, Indian Cultural Association, International dents' Society, Jewish Activist Front, Korean Student Association, Nichiren shu Study Academy, Organization of Arab Students, Parachute Club, Proj-t Share, SERVE, Student-Faculty Union for an Open University, Students r World Unification, Student Mobilization Committee to End the War in utheast Asia, Veterans and Reservists Against the War, Young Americans r Freedom, Young Democrats, Young Socialist Alliance.

OFESSIONAL ORGANIZATIONS

American Society of Civil Engineers (Student Chapter).
American Society of Mechanical Engineers (Student Chapter).
Institute of Electrical and Electronic Engineers (Student Chapter).
Theta Tau (Gamma Beta Chapter).—A national professional (engineering) ternity. Membership by invitation to outstanding students who have com-eted successfully at least the first year in the School of Engineering and Ap-ed Science.

BLICATIONS

cademic Forum (student-faculty journal), *The Cherry Tree* (the yearbook), *he University Hatchet* (semi-weekly newspaper), *Journal of International and omparative Studies* (publication of Consortium graduate students), *Mecheleciv* ngineers' publication), *The Rock Creek* (literary magazine), *Student Direc-ry, This Week* (weekly list of scheduled events).

RELIGIOUS ORGANIZATIONS

Baptist Student Union, B'nai B'rith Hillel Foundation, Christian Science Organization, Eastern Orthodox Club, Lutheran Student Association, Newman Foundation, Religious Society of Friends, Unitarian-Universalist Club, United Christian Fellowship, Wesley Foundation.

SOCIAL FRATERNITIES

Delta Tau Delta, Kappa Sigma, Phi Sigma Delta, Sigma Alpha Epsilon, Sigma Chi, Sigma Nu, Sigma Phi Epsilon, Tau Kappa Epsilon.

SOCIAL SORORITIES

Delta Gamma, Kappa Alpha Theta, Kappa Kappa Gamma, Phi Sigma Sigma.

SPORTS

The University is a member of the National Collegiate Athletic Association and the Eastern College Athletic Conference. Its teams participate against the major universities throughout the Midwest and eastern seaboard. The intercollegiate program is comprised of basketball, baseball, soccer, tennis, golf, wrestling, rifle, and crew.

The University offers a broad program of intramural sports activities for both men and women through the Department of Physical Education, Health, and Recreation.

MAJOR PROGRAM EVENTS

Recreation Program.—The University Recreation Association and the Department of Physical Education arrange a wide variety of sports and recreational activities and special events for all students.

Concert Series.—The University Program Board sponsors concerts each semester at which nationally known entertainers perform.

Orchestra and Concert Series.—The University Orchestra and Chorus are two facets of the lively arts available to students either as credit courses or as extracurricular activities. The Chorus presents major performances to the University community four or five times a year, including regular Christmas and Spring concerts. The University Orchestra presents four or five recitals a year.

Theatre.—The Drama Department produces seven major plays during the year on the new proscenium/thrust stage in the Dorothy Betts Marvin Theatre or in Lisner Auditorium. Several original and experimental plays are produced in the Experimental Theatre. Students have the opportunity to participate in all aspects of theatre and may receive credit toward their B.A. or M.F.A. degrees for some of their production work.

Art Exhibits.—The work of locally, nationally, and internationally known artists is shown in monthly exhibits in the Dimock Gallery in Lisner Lounge and in the art gallery of the Cloyd Heck Marvin Center. With the cooperation of the Curator of Art, an annual student art exhibit is presented.

THE UNIVERSITY

STORY AND ORGANIZATION

E GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Colum-an College in the District of Columbia. The name of the institution was anged in 1873 to Columbian University and in 1904 to The George Wash-gton University. The debt of the University to George Washington whose me it bears is an intangible one.

George Washington, as President and as private citizen, had urgently insisted on the establishment of a National University in the Federal City. There he ged that, while being instructed in the arts and sciences, students from all rts of the country would acquire the habits of good citizenship, throwing off eir prejudices and gaining at first hand a knowledge of the practice, as well the theory, of republican government. To further the materialization of his es, Washington left a bequest of fifty shares of The Potomac Company wards the endowment of a University to be established within the limits of District of Columbia, under the auspices of the General Government, if al government should incline to extend a fostering hand towards it." The ngress never extended "a fostering hand." The Potomac Company passed t of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great ssionary urge and the need for a learned clergy, a group of dedicated min-ers and laymen sponsored a movement for the establishment of a college in e District of Columbia. Inspired largely by the zeal and energy of the Rev-end Luther Rice, they raised funds for the purchase of a site and petitioned ngress for a charter. After much delay and amendment, Congress granted harter which was approved by President Monroe on February 9, 1821. To feguard the College's nonsectarian character it provided "that persons of ery religious denomination shall be capable of being elected Trustees; nor hall any person, either as President, Professor, Tutor or pupil, be refused dmittance into said College, or denied any of the privileges, immunities, or antages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, activities were centered on College Hill, a tract of forty-six and a half acres tween the present Fourteenth and Fifteenth Streets and extending north from rida Avenue to somewhat beyond Columbia Road. The Medical School as located downtown. For the better part of the Columbian University period, e buildings of the University were situated along H Street between Thirteenth nd Fifteenth Streets. The Medical School group still remains there.

During the last half century the University's present plant has been devel
in that section of the old First Ward familiarly known as "Foggy Bottom,
tween Nineteenth and Twenty-fourth Streets, south of Pennsylvania Ave
Within a few blocks are the White House, the Department of the Interior
State Department, the World Bank, and many other government offices
international agencies. The area is not without its reminders of historic int
to the University. President Monroe, who signed the Charter, lived at 201
Street. The first President of the Board of Trustees, the Reverend Obadia
Brown, was for fifty years the pastor of a church at Nineteenth and Eye Str
and Washington selected Twenty-third and E Streets as the site of the Nati
University he hoped to see established.

The University as it is now organized consists of Columbian College of
and Sciences (undergraduate); the Graduate School of Arts and Sciences;
professional schools, which include the National Law Center and the scho
of Medicine, Engineering and Applied Science, Education, Government
Business Administration, and Public and International Affairs; the College
General Studies; the Division of University Students; and the Summer Sessi

The George Washington University is privately endowed and is governed
a self-perpetuating Board of Trustees of which the president is an ex offi
member.

THE UNIVERSITY LIBRARIES

The Library collections of the University are housed in the University Libra
the general library of the University, and in the departmental libraries of l
and medicine.

These collections contain over 545,000 volumes—about 386,000 in the U
versity Library, about 114,000 in the Law Library, and about 47,000 in t
Medical Library. Approximately 30,000 volumes a year are added to t
Library's resources. Endowments, supplementing the University appropriatio
provide books in the fields of American civilization, American literatu
foreign service, history, public finance, and the social sciences; and gifts fro
many sources have enriched the collections. The Libraries currently recei
5,000 periodicals.

Information concerning the use of the Libraries may be obtained at t
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ASSISTANTS IN INSTRUCTION

Arthur Zachai, *Graduate Teaching Fellow in Engineering*
B.S. in E.E. 1965, Case Western Reserve University; M.S. 1971, George Washington University

Robert Mayer Zeskind, *Graduate Teaching Fellow in Electrical Engineering*
B.S. in Engr. 1965, Case Western Reserve University; M.S. 1968, George Washington University

APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety of the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property, or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate* and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 19, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs† of The George Washington University as soon after order is restored as is practicably possible.

---

* The University Senate has been renamed the Faculty Senate.

† The duties and functions of the Hearing Committee on Student Affairs are now performed by the Joint Committee of Faculty and Students.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its traditional commitment to freedom of expression (a) by continuing to permit business and government organizations which are recruiting employees to conduct their activities at designated places on campus, and (b) by placing no obstacle to students who may wish to protest the presence of such recruiters, provided, however, that such protest shall be orderly and shall not impede or disrupt the recruiter in his activities.

The University affirms its place as a forum for the free exchange of ideas (a) by assuring that guests invited to speak on this campus at duly scheduled meetings shall have the right to appear and to be heard, and (b) by sanctioning the freedom of students to express dissent from the views of the speaker, provided, however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-obstruction; it accepts the former as a legitimate expression of dissent while rejecting the latter as an abridgement of the freedoms of the individuals who may be its object.

The following was approved by the University's Board of Trustees on October 19, 1968:

The George Washington University is opposed to discrimination based on race, color, or creed. Such discrimination may have appeared in campus organizations in the past. In the future, however, no organization can be recognized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent, considered adequate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on October 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, research, and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

(c) who disobeys general regulations of the University, or

who damages University property or injures members or guests of the
rsity,
be punished for his conduct by dismissal from the University, or by some
disciplinary action, through procedures established within the University
e government of its members.
order to insure due process, any student subject to dismissal or other
linary action on the grounds of violating any of the premises of this
ution shall have, at his discretion, the right of review of the action by the
ersity Hearing Committee on Student Affairs.*

* The duties and functions of the Hearing Committee on Student Affairs are now performed by the Joint Committee of Faculty and Students.

ANNUAL ISSUES OF THE UNIVERSITY BULLETIN

Requests for the following publications must include your zip code and should be addressed as indicated.

COLLEGE OF GENERAL STUDIES, Dean of the College

NATIONAL LAW CENTER, Dean of the Center

SCHOOL OF ENGINEERING AND APPLIED SCIENCE, Dean of the School

UNDERGRADUATE AND GRADUATE CATALOGUE (Arts and Sciences, Education, Government and Business Administration, Public and International Affairs), Office of Admissions

SCHOOL OF MEDICINE, Admissions Office, School of Medicine

SUMMER SESSIONS CATALOGUE, Dean of the Summer Sessions

SCHEDULE OF CLASSES: FALL AND SPRING SEMESTERS, Registrar

SCHEDULE OF CLASSES: SUMMER SESSIONS, Dean of the Summer Sessions

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COLUMBIAN COLLEGE OF ARTS AND SCIENCES: Associate in Arts (A.A.), Asso
ciate in Arts in General Studies (A.A. in Gen.Std.), Bachelor of Arts (B.A
Bachelor of General Studies (B.Gen.Std.), Bachelor of Science (B.S.), Bache
lor of Science in Environmental Health (B.S. in Env.Health), Bachelor of Sc
ence in Geodetic and Cartographic Science (B.S. in Geod. and Cart.Sc
Bachelor of Science in Medical Technology (B.S. in Med.Tech.), and Bachelo
of Science in Oceanography (B.S. in Ocea.)

GRADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master
Arts in Special Studies (M.A. in Sp.Std.), Master of Fine Arts (M.F.A
Master of Music (Mus.M.), Master of Science (M.S.), Master of Science
Teachers (M.S. for Teachers), Master of Science in Forensic Science (M.S
Forens.S.), Master of Science in Special Studies (M.S. in Sp.Std.), and Doct
of Philosophy (Ph.D.)

SCHOOL OF MEDICINE: Doctor of Medicine (M.D.)

NATIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Mast
of Comparative Law (M.Comp.L.), Master of Comparative Law (Americ
Practice) (M.Comp.L.(Am.Prac.)), and Doctor of Juridical Science (S.J.D

SCHOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil E
gineering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) (B.S
(E.E.)), Bachelor of Science (Mechanical Engineering) (B.S. (M.E.)), Maste
of Science (M.S.), Master of Engineering Administration (M.E.A.), and Do
tor of Science (D.Sc.)

SCHOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.), Bachel
of Science in Physical Education (B.S. in P.E.), Master of Arts in Educatio
(M.A. in Ed.), Master of Arts in Teaching (M.A.T.), Education Specia
(Ed.S.), and Doctor of Education (Ed.D.)

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Busine
Administration (B.B.A.), Bachelor of Science in Administration (B.S. in Adm
Master of Arts in Government (M.A. in Govt.), Master of Arts in Heal
Care Administration (M.A. in H.C.A.), Master of Business Administrati
(M.B.A.), Master of Public Administration (M.P.A.), Master of Science
Administration (M.S. in Adm.), Master of Urban and Regional Planning (
of Urb. and Reg.Plan.), Post-Master's Graduate Certificate in Health Ca
Administration (Grad.Cert. in H.C.A.), Doctor of Business Administrati
(D.B.A.), and Doctor of Public Administration (D.P.A.)

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A
Master of Arts (M.A.), and Master of Science in International Affairs (M
in I.A.)






BULLETINS
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FACTS ABOUT GEORGE WASHINGTON UNIVERSITY

General Information	Private, nonsectarian, coeducational, founded 1821
Location	Washington, D.C., bounded by Pennsylvania Avenue and 19th, F, and 24th Streets, N.W.
Number of Students	15,190 (9,849 men, 5,341 women)
Number of Undergraduates	5,586 (2,974 men, 2,612 women)
Geographical Origin of Students	50 states, District of Columbia, 99 countries; 20% are from the Washington area
Number of Full-time Faculty	774 (77% with Doctoral degrees)
Number of Part-time Faculty	290 (includes some of the most distinguished men in Washington who serve as professorial lecturers)
Residence Hall Space	1,984 (an additional 2,000 students reside in fraternity houses, rooms, and apartments on or near the campus)
Room and Board	Cost varies from $1,380 to $1,505 for the academic year (see page 147)
Campus Organizations	130

Undergraduate majors: Accounting, American Civilization, American Literature, Anthropology, Applied Mathematics, Applied Statistics, Art History and Theory, Biology, Botany, Business Administration, Chemistry, Chinese Language and Literature, Chinese Studies, Civil Engineering, Classical Archeology and Anthropology, Classical Archeology and Greek, Classical Humanities, Dramatic Art, Economics, Electrical Engineering, Elementary Education, English Literature, Fine Arts, French Language and Literature, Geography, Geology, Germanic Languages and Literatures, History, International Affairs, International Business, Journalism, Latin, Latin American Studies, Mathematical Statistics, Mathematics, Mechanical Engineering, Medical Technology, Music (Applied, History and Literature, Theory), Philosophy, Physical Education, Physics, Political Science, Premedicine, Psychology, Public Affairs, Religion, Russian Language and Literature, Russian Literature and Culture—in Translation, Secondary Education, Sociology, Spanish American Literature, Spanish Language and Literature, Speech Communication, Speech Pathology and Audiology, Zoology.

Study leading to graduate or professional degrees is offered in the Graduate School of Arts and Sciences, the National Law Center, the School of Medicine, the School of Engineering and Applied Science, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs.



WASHINGTON UNIVERSITY CAMPUS

THE GEORGE WASHINGTON UNIVERSITY

COLUMBIAN COLLEGE OF ARTS AND SCIENCES, 1821

THE GRADUATE SCHOOL OF ARTS AND SCIENCES, 1893

THE SCHOOL OF MEDICINE, 1825

THE NATIONAL LAW CENTER, 1865

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE, 1884

THE SCHOOL OF EDUCATION, 1907

THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION, 1928

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS, 1928

THE COLLEGE OF GENERAL STUDIES, 1950

THE DIVISION OF UNIVERSITY STUDENTS, 1930

THE SUMMER SESSIONS, 1916

THE UNIVERSITY HOSPITAL, 1898

THE GEORGE WASHINGTON UNIVERSITY BULLETIN



COLLEGE
OF
GENERAL STUDIES

1972-1973



OFF-CAMPUS LOCATIONS OF THE COLLEGE OF GENERAL STUDIES

THE GEORGE WASHINGTON UNIVERSITY BULLETIN
Volume LXXI, Number 10, June, 1972

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(2 ISSUES IN OCTOBER AND 3 ISSUES IN APRIL)

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THE COLLEGE OF GENERAL STUDIES 1972–1973

WASHINGTON, D.C. 20006



From the Dean's Desk

The College of General Studies this year finds itself in the midst of some of the major changes taking place in higher education today. As the off-campus division of George Washington University, it is constantly faced with the challenges of helping the University reach out to meet the demands of the community of which it is a part—for opportunities to earn degrees outside the traditional confines of the university campus, for education to meet changing professional requirements, and for recognition of education gained through work and life experiences.

To meet some of these demands, the College of General Studies has, in cooperation with Columbian College, the School of Education, and the Graduate School of Arts and Sciences, introduced additional degrees ranging from the two-year Associate in Arts in General Studies degree to graduate degrees in Education and Special Studies which may be completed by the part-time student at selected off-campus centers; increased opportunities to earn college credit by nontraditional means, such as the College-Level Examination Program; and initiated new interdisciplinary programs tailored to the specific requirements of special groups.

Some of the more wide-ranging experiments in higher education, such as the open university and the so-called external degrees being adopted in other areas, are under constant study and evaluation. We in the College of General Studies feel our programs already include some of the concepts incorporated in these programs. If it is determined that additional changes would have an appropriate role in the educational programs of the University, the College of General Studies will move in these directions.

The primary objective of the College of General Studies, as a part of George Washington University, remains, however, to provide a sound academic program tailored to meet the individual educational needs of the part-time off-campus student at a time and location most suitable to him.

Eugene R. Magruder
Dean
College of General Studies

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THE CALENDAR 1972–73*

1972

SEPTEMBER

S	M	T	W	T	F	S
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3	4	5	6	7	8	9
10	11	12	13	14	15	16
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1973

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JULY

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12	13	14	15	16	17	18
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26	27	28	29	30	31	

1972 FALL SEMESTER

August 14–September 1	Off-campus registration† (days of registration and beginning classes will be announced in the *Off-campus Schedule of Classes*
	Application for February graduation due as part of registration
‡*September 7–9*	Registration on campus† *Thursday–Saturday*
	Application for February graduation due as part of registration
September 11	Classes begin off campus and on campus *Monday*
September 16	CGS meeting of Staff of Instruction *Saturday*
October 9	No off-campus classes *Monday*
October 23	No off-campus classes *Monday*
November 22	Thanksgiving recess begins after last class *Wednesday*
November 27	Classes resume *Monday*
December 1–2	M.A. in Sp.Std., M.S. in Adm., and M.S. in Sp.Std. Comprehensive Examinations *Friday–Saturday*

* Off-campus courses organized at any time.
† Application for graduation and for Master's Comprehensive Examinations is the student's responsibility and must be made when registering for last courses required for degree
‡ Hours of registration will be announced in the Campus *Schedule of Classes*.

December 4 School of Engineering and Applied Science Master's theses of February candidates due in Dean's Office *Monday*

December 7 Last day of campus and off-campus classes *Friday*

**December 8–22* Off-campus examination period *Friday–Friday*

December 9 M.A. in Ed. Comprehensive Examinations *Saturday*

December 13–22 Campus examination period *Wednesday–Friday*

January 2 Master's theses (other than those in the School of Engineering and Applied Science) of February candidates due in Dean's Office *Tuesday*

1973 SPRING SEMESTER

January 2–13 Off-campus registration† (days of registration and beginning classes will be announced in *Off-campus Schedule of Classes*) *Tuesday–Saturday*

Application for May graduation due as part of registration

‡January 11–13 Registration on campus† *Thursday–Saturday*

Application for May graduation due as part of registration

January 15 Classes begin on campus *Monday*

January 20 Inauguration Day (holiday) *Saturday*

January 22 Classes begin off campus *Monday*

February 19 Winter Convocation (holiday) *Monday*

March 10 Spring recess begins after last class *Saturday*

March 19 Classes resume *Monday*

April 6 School of Engineering and Applied Science Master's theses of May candidates due in Dean's Office *Friday*

April 13–14 M.A. in Sp.Std., M.S. in Adm., and M.S. in Sp.Std. Comprehensive Examinations *Friday–Saturday*

April 16 M.S. in Adm. theses of May candidates due in Dean's Office *Monday*

April 20 Last day of campus spring-semester classes *Friday*

April 21 M.A. in Ed. Comprehensive Examinations *Saturday*

April 26–May 5 Campus examination period *Thursday–Saturday*

April 28 Last day of off-campus spring-semester classes *Saturday*

**May 3–5* Off-campus examination period *Thursday–Saturday*

May 6 Commencement *Sunday*

1973 SUMMER SESSIONS

There are two six and one-half-week sessions and one thirteen-week session. Days of registration and beginning classes will be announced in the *Off-campus Schedule of Classes.*

*Off-campus final examination may be given at the last class meeting.
†Application for graduation and for Master's Comprehensive Examinations is the student's responsibility and must be made when registering for last courses required for degree.
‡Hours of registration will be announced in the Campus *Schedule of Classes.*

THE GEORGE WASHINGTON UNIVERSITY



THE UNIVERSITY

HISTORY

GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted upon the establishment of a National University in the Federal City. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "That persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets.

During the last half century the University's present plant has been developed

in that section of the old First Ward familiarly known as "Foggy Bottom," between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenue. The area is not without its reminders of historic interest to the University. President Monroe, who signed the charter, lived at 2017 Eye Street. The first President of the Board of Trustees, the Reverend Obadiah B. Brown, was for fifty years the pastor of a church at Nineteenth and Eye Streets, and Washington selected Twenty-third and E Streets as the site of the National University he had hoped to see established.

THE COLLEGES, SCHOOLS, AND DIVISIONS

George Washington University includes eleven colleges, schools, and divisions, as follows:

*Columbian College of Arts and Sciences**, through its lower and upper divisions, offers four-year programs in the arts and sciences leading to the degrees of Bachelor of Arts, Bachelor of Science, and (in cooperation with the Department of Pathology and the University Hospital) Bachelor of Science in Medical Technology. The College also provides the first two years of the prelegal and premedical programs; the preprofessional work required for admission to the School of Education and the School of Public and International Affairs. Columbian College also has academic jurisdiction over off-campus programs leading to the degrees of Associate in Arts in General Studies, Bachelor of General Studies, Bachelor of Science in Environmental Health, Bachelor of Science in Geodetic and Cartographic Science, and Bachelor of Science in Oceanography. These off-campus programs are administered by the College of General Studies.

The Graduate School of Arts and Sciences† offers advanced study and research leading to the degrees of Master of Arts, Master of Arts in Special Studies, Master of Fine Arts, Master of Music, Master of Science, Master of Science for Teachers, Master of Science in Forensic Science, Master of Science in Special Studies, and Doctor of Philosophy. The degrees of Master of Arts in Special Studies, Master of Science in Forensic Science, and Master of Science in Special Studies are also available through off-campus programs administered by the College of General Studies.

The School of Medicine† offers work leading to the degree of Doctor of Medicine.

The National Law Center offers courses leading to the degrees of Juris Doctor, Master of Laws, Master of Comparative Law, Master of Comparative Law (American Practice), and Doctor of Juridical Science; and special programs in Continuing Legal Education.

The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: Civil Engineering, Electrical Engineering, and Mechanical Engineering. Graduate programs lead to the degrees of Master of Science, Master of Engineering Administration, and Doctor of Science. The School also has academic jurisdiction over the off-campus Master's degree programs at the NASA-Langley Research Center and the Naval Ship Research and Development Center. These off-campus programs are administered by the College of General Studies.

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* Columbian College of Arts and Sciences cooperates with the School of Medicine in offering a program leading to the combined degrees of Bachelor of Arts and Doctor of Medicine.

† The Graduate School of Arts and Sciences cooperates with the School of Medicine in offering a program leading to the combined degrees of Master of Science and Doctor of Medicine and a dual program leading to the degrees of Doctor of Medicine and Doctor of Philosophy.

The School of Education offers undergraduate programs leading to the degrees of Bachelor of Arts in Education and Bachelor of Science in Physical Education; graduate studies leading to the degrees of Master of Arts in Education, Master of Arts in Teaching, Education Specialist, and Doctor of Education. The degree of Master of Arts in Education is also available through off-campus programs administered by the College of General Studies.

The School of Government and Business Administration offers undergraduate programs leading to the degree of Bachelor of Business Administration and graduate programs leading to the degrees of Master of Arts in Government, Master of Arts in Health Care Administration, Master of Business Administration, Master of Public Administration, Master of Urban and Regional Planning; the Post-Master's Graduate Certificate in Health Care Administration; the degrees of Doctor of Business Administration and Doctor of Public Administration. The School also has academic jurisdiction over the off-campus programs leading to the degrees of Bachelor of Science in Administration and Master of Science in Administration, which are administered by the College of General Studies.

The School of Public and International Affairs offers undergraduate programs leading to the degree of Bachelor of Arts and graduate programs leading to the degree of Master of Arts. The School offers an off-campus program leading to the degree of Master of Science in International Affairs.

The College of General Studies supplements the adult education program of the University through campus and off-campus study; conferences, seminars, and special projects; and continuing education and noncredit programs. This college also administers the off-campus programs over which Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Education, the School of Engineering and Applied Science, and the School of Government and Business Administration have academic jurisdiction.

The Division of University Students makes available courses for students not candidates for degrees in this University.

The Summer Sessions.

ACADEMIC STATUS

George Washington University is accredited by its regional accrediting agency, the Middle States Association of Colleges and Secondary Schools.

The University is on the approved list of the American Association of University Women and is a member of the College Entrance Examination Board.

The School of Education is a charter member of the American Association of Colleges for Teacher Education and is accredited by the National Council for Accreditation of Teacher Education for its Bachelor's and Master's degree programs.

The School of Government and Business Administration has maintained full membership in the Middle Atlantic Association of Colleges of Business Administration since 1961. It joined the Council on Graduate Education for Public Administration in 1966. By invitation, in 1968, the School became a charter academic member of the American Association of Collegiate Schools of Business Assembly. The programs in Public Accounting designed to prepare students for Certified Public Accountants examinations have been approved by the state boards of New York and of Maryland. The program in Hospital Administration is accredited by the National Accrediting Commission on

Graduate Education for Hospital Administration. The Department of Chemistry is on the approved list of the American Chemical Society. The graduate program in clinical psychology in the Department of Psychology is on the approved list of the American Psychological Association. The program in speech pathology and audiology is accredited by the Education and Training Board of the American Boards of Examiners in Speech Pathology and Audiology.

LOCATION

The University is in downtown Washington, between Pennsylvania Avenue and 19th, F, and 24th Streets, N.W. In immediately adjacent areas are the White House, the World Bank, the United States Information Agency, the Corcoran Gallery of Art, the Department of State, the Department of the Interior, the General Services Administration, the National Academy of Sciences, and the Kennedy Center for the Performing Arts.

GOVERNMENT

The University is privately endowed and is governed by a self-perpetuating Board of Trustees, with the President of the University as an ex officio member. The members of the Board are named for a period of three years and are divided into three classes. The members of one class are elected at each annual meeting to fill the places of the members whose terms of office expire. Two members of each class are nominated by the Alumni Association.

THE GENERAL ALUMNI ASSOCIATION

The objectives of this Association are to unite the graduates who wish to asso



iate themselves for charitable, educational, literary, and scientific purposes, and to promote the general welfare of the University.

Eligible members are those who have matriculated in any school of the University and who have left the University in good standing, or any person who is or has been a member of the teaching, research, or administrative staff of the University, or of the Board of Trustees of the University. Active members are those who are life members of the George Washington University General Alumni Association or the Alumni Association of any school of the University, or contributors to the George Washington University Fund.

The Alumni Office is in Bacon Hall, 2000 H Street, N.W., Washington, D.C. 20006.

All alumni are urged to keep the Alumni Office informed of changes of address or occupation and to supply information with regard to their fellow alumni.

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Dean E.R. Magruder
Associate Deans C.M. Chambers, A.C. Jensen
Assistant Dean Ruth Osborn

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INTRODUCTION

The College of General Studies, the off-campus division of George Washington University, was established in 1950 to extend the educational resources of the University to the community. The College continues in expanding the University's activities by providing academic programs for adult students and by helping to meet the continuing educational requirements of the National Capital area.

The College offers off-campus credit courses for the nondegree student, whether for personal enrichment or for updating or upgrading his professional credentials. Off-campus degree programs, administered by the College of General Studies for other colleges and schools of the University, are offered at the undergraduate and graduate levels for students who wish to pursue a more formal program of study. Experimental pilot programs of study are developed in cooperation with other colleges and schools of the University in response to specific needs of the government and business community. The College also develops and conducts noncredit courses, seminars, and workshops drawing on the resources of the University.

The Staff of Instruction for the off-campus programs includes members of the full-time faculty of the University and academically qualified part-time lecturers from the Washington professional community.

The College works closely with education directors, public school officials, and personnel administrators in government, business, and industry to develop courses of study and expand the educational opportunities for the mature student. In cooperation with these sponsoring groups the College offers courses at off-campus centers throughout the District of Columbia and in nearby Maryland and Virginia. Government agencies and installations, business organizations, or professional groups interested in having the College organize and conduct a course or a comprehensive educational program should contact the Associate Dean of the College of General Studies.

DEMIC STATUS

academic standards of the University are maintained in off-campus credit ses.

he College of General Studies is accredited by its regional accrediting ncy, the Middle States Association of Colleges and Secondary Schools.

REE PROGRAMS

umbian College of Arts and Sciences offers the following degrees off cam-

Associate in Arts in General Studies
Bachelor of General Studies
Bachelor of Science in Environmental Health
Bachelor of Science in Geodetic and Cartographic Science
Bachelor of Science in Oceanography

e Graduate School of Arts and Sciences offers the following degrees off mpus:

Master of Arts in Special Studies
Master of Science in Forensic Science
Master of Science in Special Studies

he School of Engineering and Applied Science offers the following degrees f campus:

Master of Engineering Administration
Master of Science

The School of Education offers the following degrees off campus:

Master of Arts in Education

The School of Government and Business Administration offers the following egrees off campus:

Bachelor of Science in Administration
Master of Science in Administration

PECIAL CREDIT PROGRAMS AND NONDEGREE PROGRAMS

PECIAL CREDIT PROGRAMS

To encourage participation in foreign-tour programs and continuing education throughout life, courses designed to meet needs of interested individuals, groups, and agencies are offered in the liberal arts, education, and other areas. For further information contact one of the persons listed below.

ONDEGREE PROGRAMS

Courses, conferences, seminars, and institutes are offered to meet the needs of individuals and groups. They are designed for business, industry, and professional groups. For further information contact one of the persons listed below.

For information on programs in a general area, contact Charles Chambers, Associate Dean of the College of General Studies, for Long-range Planning and Program Development, telephone 676-7015.

For information on programs in allied health, contact Earl Ross, Director of Plans and Programs, telephone 676-7320.

For information on programs concerning women, contact Ruth Osborn, Assistant Dean of the College of General Studies, for Continuing Education for Women, telephone 676-7036.
For information on Teachers' Programs, contact John Morrow, Director of Teachers' Programs, telephone 676-7015.
For information on programs in specific geographic areas, contact Ralph DeBelles, Director of District of Columbia Programs, telephone 676-7061; Douglas Carter, Director of Maryland Programs, telephone 676-7022; William Lanier, Director of Virginia Programs, telephone 676-7040.

Admission

NONDEGREE STUDENTS

OFF-CAMPUS CREDIT COURSES may be taken by nondegree students who meet the prerequisites prescribed by the department concerned; if they have previously attended a college or university, they must be in good standing. Formal University admission is not required for registration.

Nondegree students wishing to enroll in graduate courses must have completed a Bachelor's degree, or have 90 semester hours of undergraduate work and the permission of the instructor. Students with 90 semester hours of undergraduate work wishing to register for graduate courses in Accounting, Business Administration, Health Care Administration, Management Science, or Public Administration must have (1) a 3.00 average, (2) the prior approval of the department chairman who is responsible for the graduate course, (3) the prior approval of the faculty adviser, and (4) the prior approval of the Dean of the School of Government and Business Administration.

Credits earned as a nondegree student may later be transferred to degree programs at George Washington University or other colleges and universities, providing they are applicable to the desired curriculum and providing the student meets the requirements of the degree program for which he is applying.

ADMISSION AS A DEGREE CANDIDATE

Students wishing to be admitted as candidates for one of the off-campus undergraduate or graduate degree programs of George Washington University may obtain application forms from the College of General Studies, one of the University's representatives of the Off-campus Credit Programs, or the Education Officer of his agency or installation. For admissions procedure to campus degree programs, refer to the *Undergraduate and Graduate Catalogue* or the *School of Engineering and Applied Science* catalogue of George Washington University.

An application for admission, required credentials, and a nonrefundable application fee of $25* should be sent to the appropriate office.

* The application fee must be by check or postal money order, payable to George Washington University.
The application fee is waived for a student applying for readmission who was registered as a degree candidate at the time of his last registration at this University and has not since registered at another institution.

ecords presented become the property of the University and *cannot* be rned.

DERGRADUATE DEGREE CANDIDACY

mpleted application, required credentials, and the application fee should be to the Office of Admissions, George Washington University, 2121 Eye eet, N.W., Washington, D.C. 20006.

econdary school graduates applying for Associate in Arts in General dies or Bachelor's degree candidacy must present the combined evidence of an acceptable certificate of graduation from an accredited secondary ool, showing a minimum of fifteen "units"* in a college preparatory or ademic curriculum; (2) the principal's statement that the applicant is adetely prepared to undertake college work with reasonable prospect of sucs; (3) College Entrance Examination Board scores on the Scholastic Apti- e Test and the English Composition Achievement Test (for students out of gh school several years, other appropriate tests may be prescribed). The Col- e Entrance Examination Board tests are preferred; however, the American llege Testing battery scores will be accepted. The applicant should request at these scores be sent to the Office of Admissions directly from the American llege Testing Program, Iowa City, Iowa.

Mature students who do not meet these requirements may be considered for gree candidacy after the satisfactory completion of at least 15 semester hours course work with a quality-point index of 2.50 or higher, or grades of *B* or tter in 60 per cent of course work. This must include courses in English mposition (Engl 1 or 1A and 2), and 9 semester hours of course work in at ast two of the following appropriate areas: Humanities (literature, philosophy, oreign languages), Social Studies (anthropology, economics, geography, hisry, political science, psychology, sociology), Natural and Mathematical Sciices, and Business Administration.

The selection of qualifying courses should be made in conference with the faculty adviser, and a conference concerning plans for study is required of ach applicant for admission to candidacy.

DVANCED STANDING AND ADVANCED PLACEMENT

TRANSFER STUDENTS FROM OTHER COLLEGES AND UNIVERSITIES

Properly certified courses taken at accredited colleges or universities may be pplied toward a degree, subject to the curriculum requirements of the degree rogram and the rules of the college or school to which admission is sought. Although a grade of *D* is not acceptable for transfer, it may be used to satisfy curriculum requirement. It may not, however, be counted toward the total umber of semester hours required for the degree, and it should not be repeated.

Transfer students whose previous academic records raise doubts of their abilty to complete degree requirements successfully must complete 15 hours of ourse work in this College with a quality-point index of 2.50 or higher, or grades of *B* or better in 60 per cent of course work, to be considered for degree candidacy. Courses taken to qualify for candidacy must be distributed over

* A unit represents a year's study in a secondary school subject, including in the aggregate no less than 120 sixty-minute periods, or the equivalent, of prepared classroom work.

two or more of the following areas: Humanities (literature, philosophy, foreign language), Social Studies (anthropology, economics, geography, history, political science, sociology), and Natural and Mathematical Sciences. (Students who have not successfully completed an acceptable college course in English Composition must include Engl1 or 1x and 2.) Applicants who have been suspended for academic reasons from this University or another institution must fulfill the same 15-hour requirement and also obtain written approval of a petition for admission to degree candidacy from the Committee on Admission and Advanced Standing of Columbian College of Arts and Sciences or from the Dean of the School of Government and Business Administration.

In no case will more than 64 semester hours of advanced standing be granted for course work completed at a 2-year or junior college to those students planning to enroll in the Bachelor of Science in Administration degree program.

The University reserves the right to refuse credit for transfer in whole or in part, or to allow it provisionally. Credit so given may be withdrawn for subsequent poor work.

It is the responsibility of the student to have an official transcript sent directly from each institution formerly attended to the Office of Admissions, George Washington University, Washington, D.C. 20006.

If the transcript from a higher institution includes the record of his secondary school work, it is not necessary for the applicant to have forwarded a separate record from the principal of the secondary school.

EARNING CREDIT OR WAIVING REQUIREMENTS BY EXAMINATION

In addition to credit allowed in transfer from other accredited colleges or universities, a maximum of 30 semester hours of advanced standing may be obtained by any one or any combination of the following methods.

A student may earn up to a maximum of 30 hours, or waive curricular requirements without limitation (*passing a waiver examination does not entitle the student to any semester hours of credit*), by performing satisfactorily on any or all of the following:

Advanced Placement Tests (APT).—Administered by the College Entrance Examination Board.

Achievement Tests (may be used to waive requirements only).—Administered by the College Entrance Examination Board.

College Entrance Examination Board College-Level Examination Program (CLEP).—CLEP offers two types of examinations: (1) CLEP Subject-Matter Examinations—offered in 27 subject areas. These tests measure achievement in the equivalent of specific college-level courses. (Duplicate credit—by passing the examination and by passing the equivalent course—is not permissible.) (2) CLEP General Examinations—offered in five areas: Mathematics; Social Sciences; Humanities; Natural Sciences; and English Composition. (Credit-advanced standing—is not given for the General Test in English Composition.) To be eligible to take the CLEP General Examinations, a student must have been out of secondary school for three years or more.

Special Department Examinations in Columbian College of Arts and Sciences.—A student may request any department of Columbian College to offer him a special examination covering the subject matter of any specific course. (If an appropriate CLEP Subject-Matter Examination is available, the department may choose to employ it.) If a student performs satisfactorily, he may receive credit (advanced standing), waiver of a requirement, or both, at the discretion

the department. Special departmental examinations will normally be of at st three hours' duration. A fee of $25 for each course examination is charged preparing, administering, and grading.

Service Schools.—Except for those students enrolled as candidates for the chelor of Science in Geodetic and Cartographic Science or the Bachelor of ence in Oceanography degree, a maximum of 30 (or a maximum of 12 hours the courses are "professional" and the student is enrolled in a Columbian llege degree program) semester hours may be obtained on the basis of service hools satisfactorily completed, as evaluated in accordance with the "Guide to Evaluation of Educational Experience in the Armed Forces." Ordinarily ch subjects are counted as electives. No credit will be allowed for military perience as such.

Validating Examinations.—A maximum of 12 semester hours may be obned by validating examinations. With the approval of the departmental adser concerned, permission to take such examinations is granted those who are alified by work experience and background. Validating examinations may be ken only once, and a grade of *C* or better is required for credit. The fee for ch 3-hour course examination is $25.

Correspondence Courses.—Except for those students enrolled as candidates the Bachelor of Science in Administration, the Bachelor of Science in Geoetic and Cartographic Science, or the Bachelor of Science in Oceanography gree, a maximum of 15 semester hours may be earned through the successful mpletion of correspondence courses of college level which are offered by the S Armed Forces Institute or a regionally accredited college or university.

Examination for Waiving Curriculum Requirements.—During the first full mester of undergraduate degree candidacy, a student wishing to omit a reired course may, with the permission of the faculty adviser, take a waiver amination, the passing of which relieves him of the curriculum requirement d qualifies him for registration in an advanced course. The fee for each 3-ur course examination is $5.

ASTER'S DEGREE CANDIDACY

The Degree of Master of Arts in Education (School of Education).—Apication for Master's degree candidacy should be made by the time of regisation. Completed application, required credentials, and the application fee uld be sent to the Office of the Dean, School of Education, 2201 G Street, W., Washington, D.C. 20006.

Admission to graduate study toward a Master's degree requires a Bachelor's gree from an accredited institution, an undergraduate quality-point index of 50 (a *C* + average) or above, demonstrated interest in teaching, and perinal traits that show promise as a teacher. Two years of successful teaching e required before admission to candidacy in the field of school administration.

The Degree of Master of Science in Administration (School of Government d Business Administration).—Application for Master's degree candidacy *must* e made before or immediately after registration. Completed application, reired credentials, and the application fee should be sent to the Admissions ficer, School of Government and Business Administration, 710 21st Street, W., Washington, D.C. 20006.

The general requirement for Master's candidacy is a Bachelor's degree, inding at least 90 semester hours of academic work from a regionally ac-

credited college or university with an over-all quality-point index of 3.00 (a *B* average), adequate undergraduate preparation for the chosen area of concentration, and satisfactory performance on the Admission Test for Graduate Study in Business*. Students with undergraduate averages below *B* may qualify by their scores on the Admission Test for Graduate Study in Business. Students who lack the necessary academic quality for the chosen graduate field may qualify by earning a *B* or better grade in prescribed undergraduate courses.

The Admission Test for Graduate Study in Business must be taken prior to application for degree candidacy or during the semester in which application is made. For information concerning the date and place for taking the test, contact the Educational Testing Service, Box 955, Princeton, N.J. 08540.

No more than 6 semester hours of credit toward the Master's degree will be granted for work taken in nondegree status at this University (before application to this degree program and while the application is being processed).

A maximum of 6 semester hours of advanced standing may be credited toward the degree by transfer of credit for approved graduate work taken at an accredited college or university. Request for advanced standing must be made at the time of application for Master's degree candidacy.

The Degrees of Master of Arts in Special Studies or *Master of Science in Special Studies (Graduate School of Arts and Sciences).*—These Master's degree off-campus programs are arranged for groups of students participating in a particular program which has been approved by the Graduate School of Arts and Sciences. Application for Master's degree candidacy must be made by members of the group before registration. Completed application, required credentials, and the application fee should be sent to the Office of the Dean, Graduate School of Arts and Sciences, 2000 H Street, N.W., Washington, D.C. 20006.

Admission to graduate study toward a Master's degree in this School requires a Bachelor's degree, from an accredited college or university, with an over-all quality-point index of 3.00 (a *B* average) or an equivalent grade.

No more than 6 semester hours of credit toward a Master's degree will be granted for work taken in nondegree status at this University.

A maximum of 6 semester hours of advanced standing may be credited toward a Master's degree by transfer of credit for approved graduate course work taken at an accredited college or university.

The Degrees of Master of Science or *Master of Engineering Administration (School of Engineering and Applied Science).*—Application for Master's degree candidacy *must* be made by the time of registration. Completed application, required credentials, and the application fee should be sent to the Director of Engineering Admissions, School of Engineering and Applied Science, 725 23rd Street, N.W., Washington, D.C. 20006.

Admission to graduate study toward a Master's degree requires an appropriate Bachelor's degree from a recognized institution and evidence of capacity for productive work in the field selected, as indicated by undergraduate grades, Graduate Record Examination scores, and similar data.

An applicant who has significant deficiencies in preparation may be required to take prescribed undergraduate courses as an unclassified student before being admitted to graduate student status. In some cases, if such deficiencies are minimal, he may be admitted to graduate student status and allowed to

* This is a test of general aptitude and does not presume an undergraduate major in Business Administration.

ke a limited number of graduate courses while completing the undergraduate urses in which he is deficient. In no case may the undergraduate courses thus ken fulfill any part of the requirements for the Master's degree.

Students wishing to apply for admission to the program of study leading to e degree of Master of Engineering Administration are required to meet the llowing additional admission requirements: the applicant must have an adeuate knowledge of the principles of human relations, the fundamentals of ccounting, and the fundamentals of statistics. This requirement can be met by tisfactory completion of the following undergraduate courses or approved quivalents: Acct 115, *Survey of Financial Accounting;* E Ad 170, *Basic Quantative Methods for Engineering Administration;* and Psyc 145, *Psychology of Management.* A student is required to earn the grade of *C* or better in these ourses (unless the requirement is stipulated to be a grade of *B* or better upon s admission) in each undergraduate prerequisite course. If this scholarship equirement is not met, the student is barred from further enrollment. A student not permitted to repeat any of the undergraduate prerequisite courses. Credit or prerequisite courses is not applicable toward the degree of Master of Engineering Administration.

Up to 6 semester hours of satisfactory credit (with grades of *A* or *B*), which ormally must have been earned in a graduate program at another recognized stitution, *may* be accepted in transfer, when applicable, to satisfy Master's egree requirements in the School of Engineering and Applied Science. However, the student must, with the approval of his adviser, petition to the appropriate department chairman for such a transfer.

READMISSION

A student who withdraws, is suspended, or is otherwise absent from the University for one semester or more, may re-enter and continue his work only under the rules and regulations in force at the time of his return. Complete and official transcripts from each institution the student has attended since making his previous application must be sent to the appropriate office at this University before his application for readmission can be evaluated.

When there are curriculum changes in graduate programs in the School of Government and Business Administration, the readmitted student may be required to take additional course work in preparation for the Master's Comprehensive Examinations.

Registration

OFF-CAMPUS REGISTRATION is conducted before or at the first class meeting of each course, at times and places stated in the *Off-campus Schedule of Classes*, available well in advance of each semester.

Registration in an off-campus course *constitutes admission to that course only.* It does not admit the student to campus courses or to degree candidacy. Only students admitted to degree candidacy may enroll as full-time students (for 12 semester hours or more). Those who have been graduated from high school recently and wish to be *full-time freshman* students at this University should apply for admission to the appropriate college or school on campus.

credited college or university with an over-all quality-point index of 3.00 (
B average), adequate undergraduate preparation for the chosen area of con
centration, and satisfactory performance on the Admission Test for Graduate
Study in Business*. Students with undergraduate averages below *B* may
qualify by their scores on the Admission Test for Graduate Study in Business.
Students who lack the necessary academic quality for the chosen graduate field
may qualify by earning a *B* or better grade in prescribed undergraduate courses.

The Admission Test for Graduate Study in Business must be taken prior to
application for degree candidacy or during the semester in which application is
made. For information concerning the date and place for taking the test, con-
tact the Educational Testing Service, Box 955, Princeton, N.J. 08540.

No more than 6 semester hours of credit toward the Master's degree will be
granted for work taken in nondegree status at this University (before applica-
tion to this degree program and while the application is being processed).

A maximum of 6 semester hours of advanced standing may be credited
toward the degree by transfer of credit for approved graduate work taken at an
accredited college or university. Request for advanced standing must be made
at the time of application for Master's degree candidacy.

The Degrees of Master of Arts in Special Studies or *Master of Science in
Special Studies (Graduate School of Arts and Sciences).*—These Master's de-
gree off-campus programs are arranged for groups of students participating
in a particular program which has been approved by the Graduate School of
Arts and Sciences. Application for Master's degree candidacy must be made
by members of the group before registration. Completed application, required
credentials, and the application fee should be sent to the Office of the Dean,
Graduate School of Arts and Sciences, 2000 H Street, N.W., Washington,
D.C. 20006.

Admission to graduate study toward a Master's degree in this School re-
quires a Bachelor's degree, from an accredited college or university, with an
over-all quality-point index of 3.00 (a *B* average) or an equivalent grade.

No more than 6 semester hours of credit toward a Master's degree will be
granted for work taken in nondegree status at this University.

A maximum of 6 semester hours of advanced standing may be credited
toward a Master's degree by transfer of credit for approved graduate course
work taken at an accredited college or university.

The Degrees of Master of Science or *Master of Engineering Administration
(School of Engineering and Applied Science).*—Application for Master's degree
candidacy *must* be made by the time of registration. Completed application,
required credentials, and the application fee should be sent to the Director of
Engineering Admissions, School of Engineering and Applied Science, 725 23rd
Street, N.W., Washington, D.C. 20006.

Admission to graduate study toward a Master's degree requires an appropriate
Bachelor's degree from a recognized institution and evidence of capacity for
productive work in the field selected, as indicated by undergraduate grades,
Graduate Record Examination scores, and similar data.

An applicant who has significant deficiencies in preparation may be required
to take prescribed undergraduate courses as an unclassified student before
being admitted to graduate student status. In some cases, if such deficiencies
are minimal, he may be admitted to graduate student status and allowed to

* This is a test of general aptitude and does not presume an undergraduate major in Business
Administration.

take a limited number of graduate courses while completing the undergraduate courses in which he is deficient. In no case may the undergraduate courses thus taken fulfill any part of the requirements for the Master's degree.

Students wishing to apply for admission to the program of study leading to the degree of Master of Engineering Administration are required to meet the following additional admission requirements: the applicant must have an adequate knowledge of the principles of human relations, the fundamentals of accounting, and the fundamentals of statistics. This requirement can be met by satisfactory completion of the following undergraduate courses or approved equivalents: Acct 115, *Survey of Financial Accounting;* E Ad 170, *Basic Quantitative Methods for Engineering Administration;* and Psyc 145, *Psychology of Management.* A student is required to earn the grade of *C* or better in these courses (unless the requirement is stipulated to be a grade of *B* or better upon his admission) in each undergraduate prerequisite course. If this scholarship requirement is not met, the student is barred from further enrollment. A student is not permitted to repeat any of the undergraduate prerequisite courses. Credit for prerequisite courses is not applicable toward the degree of Master of Engineering Administration.

Up to 6 semester hours of satisfactory credit (with grades of *A* or *B*), which normally must have been earned in a graduate program at another recognized institution, *may* be accepted in transfer, when applicable, to satisfy Master's degree requirements in the School of Engineering and Applied Science. However, the student must, with the approval of his adviser, petition to the appropriate department chairman for such a transfer.

READMISSION

A student who withdraws, is suspended, or is otherwise absent from the University for one semester or more, may re-enter and continue his work only under the rules and regulations in force at the time of his return. Complete and official transcripts from each institution the student has attended since making his previous application must be sent to the appropriate office at this University before his application for readmission can be evaluated.

When there are curriculum changes in graduate programs in the School of Government and Business Administration, the readmitted student may be required to take additional course work in preparation for the Master's Comprehensive Examinations.

Registration

OFF-CAMPUS REGISTRATION is conducted before or at the first class meeting of each course, at times and places stated in the *Off-campus Schedule of Classes,* available well in advance of each semester.

Registration in an off-campus course *constitutes admission to that course only.* It does not admit the student to campus courses or to degree candidacy. Only students admitted to degree candidacy may enroll as full-time students for 12 semester hours or more). Those who have been graduated from high school recently and wish to be *full-time freshman* students at this University should apply for admission to the appropriate college or school on campus.

Off-campus degree candidates in an area of concentration with a small enr ment which would not justify offering courses off campus may have to regis for campus courses in order to meet the requirements for the degree.

Auditing.—With the permission of the instructor, students may register "Auditors." An auditor is not required to take active part or to take examin tions; he receives neither grades nor credit. Tuition is the same for the audit as for the student registered for credit. With the approval of the Dean, student may change from credit to audit status during the first third of t semester. A student who takes a course as an auditor may not repeat it la for credit.

Concurrent Registration.—A student registered as a degree candidate in a other college or school of the University may take credit courses in the Colle of General Studies *only by permission (granted prior to registration) of t dean* of the college or school concerned. A "College of General Studies Off campus Concurrent Registration Permit" form must be obtained from th appropriate college or school, signed by the dean of that college or school, an presented at the time of registration in the College of General Studies.

Service personnel enrolled full time for campus courses need the permissio of the Dean of the College of General Studies to register concurrently for off campus courses.

Any student taking course work in another college or school of the Univer sity or at another institution through the Consortium of Universities of th Washington Metropolitan Area, Inc., must have the permission of his Dean



Fees and Financial Regulations

ALL FEES should be paid by check or money order, made payable to George Washington University.

The following fees were adopted for the academic year 1972–73. (See pages 24–25 for projected tuition increases for 1973–76.)

Tuition

On campus:	
Full-time undergraduate program (12 to 18 hours), each semester	$1,100.00
Part-time undergraduate program or hours in excess of 18, for each semester hour	80.00
Graduate study for courses other than those in the School of Engineering and Applied Science, for each semester hour	80.00
Graduate study for courses in the School of Engineering and Applied Science, for each semester hour	82.00
Off campus:*	
For each semester hour	60.00
Naval Ship Research and Development Center programs, for each semester hour	82.00
ICAF programs, for each semester hour	68.00
Thesis:†	
ICAF programs, for each semester hour	68.00
Master of Arts in Education and Master of Science in Administration degree programs (other than ICAF), for each semester hour	80.00
Naval Ship Research and Development Center programs, for each semester hour	82.00
NASA-Langley Research Center programs for nonemployees, for each semester hour	60.00

University Center Fee (charged only to students registered on campus, nonrefundable)

For students registered for 11 or more semester hours on campus:	
For each semester	37.50
For students registered for less than 11 semester hours in a semester on campus:	
For each semester hour for which the student registers	3.50
For on-campus degree candidates maintaining "continuous registration" status:	
For each semester	3.50

Special Fees

Application fee (degree candidate), nonrefundable	25.00
Graduation fee, due and payable at the time of registration for the last semester or summer session	25.00
Special Columbian College of Arts and Sciences departmental examination fee, for each course to qualify for receiving credit (advanced standing), waiver of requirement, or both	25.00

*Except ICAF and Naval Ship Research and Development Center programs.

†Payment of tuition for a Master's thesis entitles the candidate, during the period of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, additional time may be granted in accordance with the regulations of the school in which the student is registered. (See page 33 for regulations governing military leave.)

Continuous Registration fee, *off-campus degree candidates*, to maintain "continuous registration" during any semester of absence from the University* $60.00

Continuous Registration fee, *on-campus degree candidates in the School of Engineering and Applied Science and degree candidates in the Naval Ship Research and Development Center programs*, to maintain "continuous registration" during any semester of absence from the University or after completion of tuition requirements* 82.00

Continuous Registration fee, *on-campus candidates (other than those in the School of Engineering and Applied Science)*, to maintain "continuous registration" during any semester of absence from the University, or after completion of tuition requirements* 80.00

Continuous Registration fee, *ICAF degree candidates*, to maintain "continuous registration" during any semester of absence from the University* 68.00

Late-registration fee, for failure to register for campus courses within the designated period 15.00

Fee for binding two copies of the Master's thesis (other than ICAF programs) 10.00

Fee for binding two copies of the Master's thesis (ICAF programs)..... 7.00

Late-payment fee, for failure to make payments when due (see "Payment of Fees," pages 25–26) 15.00

On-campus financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," pages 25–26) 35.00

Off-campus financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," pages 25–26) 15.00

Returned check fee, charged a student whose check is returned because of insufficient funds or improper drafting 15.00

Fee for each examination to waive a curriculum requirement..... 5.00

Validating Examination fee, for each 3-hour course examination..... 25.00

Transcript fee, charged for each transcript of record..... 2.00

PROJECTED TUITION INCREASES 1973–76

Projected increases for the academic years 1973–74, 1974–75, and 1975–76 have been estimated as follows:

On Campus

Increase by year (full-time undergraduate students):

1973–74	$150.00
1974–75	75.00
1975–76	75.00

Increase by semester hour (graduate and part-time undergraduate students):

1973–74	6.00
1974–75	4.00
1975–76	4.00

* Payment of the continuous registration fee entitles the student who is granted leave of absence to return and continue his work toward a degree under the academic requirements which were in force at the time of his first registration. The continuous registration fee applies toward neither tuition fee nor residence requirements for the degree. This fee does not apply to students granted military leave (see page 33).

Off Campus

Increase by semester hour (except ICAF and Naval Ship Research and Development Center programs):

Course Work Other than Thesis

1973–74	$3.00
1974–75	4.00
1975–76	3.00

Thesis for Master of Arts in Education and *Master of Science in Administration programs*

1973–74	6.00
1974–75	4.00
1975–76	4.00

Thesis for NASA-Langley Research Center programs for nonemployees

1973–74	3.00
1974–75	4.00
1975–76	3.00

Increase by semester hour (ICAF programs including thesis):

1973–74	5.00
1974–75	5.00
1975–76	3.00

Increase by semester hour (Naval Ship Research and Development Center programs including thesis):

1973–74	6.00
1974–75	4.00
1975–76	4.00

Every effort will be made to keep tuition increases within the above limits. However, it is not possible to project future economic data with certainty, and circumstances may require an adjustment of these estimates.

PAYMENT OF FEES

OFF-CAMPUS COURSES

Fees for each semester are due and payable in full at the time of each registration; however, a student registering for a *thirteen-week credit course* may sign a contract at each registration to make payments in three equal installments—one-third at the time of registration, one-third by October 10, 1972, and one-third by November 10, 1972 (for the fall semester); and one-third by February 12, 1973, and one-third by March 12, 1973 (for the spring semester). Payments are due at the stipulated times. Payment envelopes are provided by the College; the University will not obligate itself to notify students of payments due.

Students receiving partial government tuition assistance must pay their portion of the tuition in full at the time of registration.

Tuition and fees for credit courses lasting less than twelve weeks, and for all noncredit courses, are payable in full at registration.

Students who fail to make any payment when due will be automatically charged a $15.00 late-payment fee and will be subject to an interest charge of 8 per cent per annum. Accounts which become 30 days past due will be financially encumbered. In the event a student's account is financially encumbered,

the student forfeits his rights to the use of deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $15.

Students auditing courses are subject to all fees charged to students registered for credit.

CAMPUS COURSES

No student is permitted to complete registration or attend classes until all charges are paid. Tuition and fees for each semester are due and payable in full at the Office of the Cashier at the time of each registration. Checks and postal money orders should be made out to George Washington University.

The Student Accounts Office has responsibility for billing and maintaining student accounts for tuition, various fees, and room and board charges. A student registered for 6 semester hours or more may sign a deferred payment contract with the Student Accounts Office at the time of each registration permitting him to pay one-half of the total tuition and fees (except for fees payable in advance) at the time of registration and the remaining half on or before November 1, 1972 (for the fall semester), and March 7, 1973 (for the spring semester). Interest at the rate of 8 per cent per annum on the unpaid balance will be charged from the date of registration to the date payment is made. The University will not obligate itself to notify the student, in advance, of the payment-due date for the second half of the semester charges.

Students receiving tuition assistance in the form of scholarships, government tuition contracts, or other forms of tuition awards are not permitted to sign deferred payment contracts unless the total tuition and fee charges exceed the value of the tuition awards by $500 or more. Under such circumstances the student may be permitted to pay one-half of the amount due from the student at the time of registration and to defer the balance by signing a deferred payment contract.

Students who fail to make any payment when due will be automatically charged a $15 late-payment fee. Accounts which become 30 days past due will be financially encumbered and will be subject to an interest charge of 8 per cent per annum. In the event a student's account is financially encumbered, the student forfeits his rights to the use of deferred payment contracts in future semesters, and the Student Accounts Office will notify the Registrar to withhold grades, future registration privileges, transcripts, diplomas, and other academic information until the account is settled financially. Financial settlement will require payment in full of all amounts due the University in addition to a financial reinstatement fee of $35.

Students auditing courses are subject to all fees charged to students registered for credit.

REFUND OF FEES FOR OFF-CAMPUS REGISTRATION*

Applications for withdrawal from the University or for change in class sched-

* For regulations concerning refunds of fees for students who register for courses on campus, see the *Undergraduate and Graduate Catalogue* or the *School of Engineering and Applied Science* catalogue.

ue must be made in person or in writing to the dean of the college, school, or vision in which the student is registered. Notification to an instructor is not n acceptable notice.

Refunds are granted during the fall and spring semesters and only for the 10-eek or more session during the summer (withdrawal dates will be announced the *Off-campus Summer Sessions Schedule of Classes*). In authorized with-rawals and changes in schedule, cancellations of semester tuition charges will e made in accordance with the following schedule:

Withdrawal schedule:

FALL SEMESTER

Withdrawal dated on or before September 15, 1972.....90 per cent
Withdrawal dated September 18 to September 29, 1972....75 per cent
Withdrawal dated October 2 to October 13, 1972.....50 per cent
Withdrawal dated after October 13, 1972.....none

SPRING SEMESTER

Withdrawal dated on or before January 26, 1973.....90 per cent
Withdrawal dated January 29 to February 9, 1973.....75 per cent
Withdrawal dated February 12 to February 23, 1973.....50 per cent
Withdrawal dated after February 23, 1973.....none

No exceptions will be made for holidays, late registrations, absences, or class rescheduling for any reason whatsoever.

A student who is granted military leave before completing the semester will receive credits for current charges in accordance with the schedule for withdrawals from the University (see No. 1, above.) Payments made in excess of the nonrefundable balance will be refunded to the student. The nonrefundable balance will be maintained as a deferred credit for use by the student when he returns to the University (see "Military Leave," page 33).

In no case will tuition be reduced or refunded because of absence from classes. Payment applies only to the semester for which a registration charge is incurred and will not be credited to another semester (exception: students granted military leave, see page 33).

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

Regulations

CAMPUS STUDY

OFF-CAMPUS DEGREE CANDIDATES may register for campus courses approved for their programs if these courses are not available at off-campus centers. Students must notify the Office of Student Records, College of General Studies, telephone 676-7017, at least two weeks prior to the date of campus registration so that a registration packet may be prepared. Packets may be picked up by the student at the University Library prior to and during registration.

A student may register for on-campus courses as a nondegree student in th Division of University Students.

ACADEMIC WORKLOAD

Only students admitted to degree candidacy may enroll as full-time student i.e., for 12 or more hours in a semester. Students taking course work to qua for degree candidacy who are registered in this College may not take more than 10 hours in a semester.

A full-time undergraduate student who is not on probation may not ordi narily take more than 17 semester hours. A student employed more than hours a week, who is not on probation, may not take more than 10 hours.

A full-time undergraduate student who is a candidate for a degree in th School of Government and Business Administration and whose quality-point index is 3.50 or higher may not take more than 18 hours. An employed undergraduate student who meets the same standard may not take more than 1 hours.

A full-time undergraduate student who is a candidate for a degree in Colum bian College of Arts and Sciences and who, during the immediately preceding semester, has received no grades below *B* and has earned grades of *A* in three courses totaling at least 9 semester hours may take 18 or 19 hours. An employed undergraduate student who, during the immediately preceding se mester, has no grades below *B* and has earned grades of *A* in two courses totaling at least 6 semester hours may not take more than 12 hours.

A student on probation normally may not take more than 3 semester hours

A student who accepts employment after registration or at any time during a semester must report that fact immediately to the Dean so that his program may be adjusted, if necessary.

A full-time graduate student who is a candidate for a degree in the School of Government and Business Administration may not take more than 12 se mester hours. A graduate student who is employed more than 20 hours a week may not take more than 6 hours.

A full-time student in the Graduate School of Arts and Sciences register for 9 to 12 semester hours each semester; a part-time student registers for a minimum of 6 semester hours each semester. These requirements do not apply when a student has fewer than 9 semester hours (full-time) or 6 semester hours (part-time) remaining to complete his program. No more than 15 semester hours may be taken during any one semester.

ATTENDANCE

A student may not attend classes until registration is completed and fees due are paid. He may attend only those classes for which he is registered.

In a thirteen-week course in which classes meet once a week, *one* unexcused absence is permitted. In a thirteen-week course in which classes meet twice a week, *two* unexcused absences are permitted. In a six and a half week course meeting twice a week, *one* unexcused absence is permitted. Minimum absences per se will not be used as the sole reason for failing a course. It is the University policy that students attend classes regularly.

Excuses must be made by written application to the instructor, or by verbal

permission later confirmed in writing. The student is held responsible for all course work.

SCHOLARSHIP

GRADES

Grades are mailed to the student through the Office of the Registrar at the close of each semester. They are not given out by instructors or the administrative staff.

UNDERGRADUATE

The following grading system is used: *A*, Excellent; *B*, Good; *C*, Average; *D*, Pass; *F*, Fail; *I*, Incomplete; *W*, Authorized Withdrawal. Except for courses which specifically state that repetition for credit is permitted, a student may not repeat for credit a course in which he has received a grade of *D* or better, unless required to do so by the department concerned. A written statement to this effect must be submitted to the Registrar by the appropriate departmental chairman.

GRADUATE

The following grading system is used: *A*, Excellent; *B*, Good; *C*, Minimum Pass; *F*, Fail; *I*, Incomplete; *CR*, Credit; *W*, Authorized Withdrawal. Except for courses which specifically state that repetition for credit is permitted, a student taking School of Education and School of Government and Business Administration courses may not repeat for credit a course in which he has received a grade of *C* or above. A student taking a Graduate School of Arts and Sciences course may repeat for credit a course in which he has received a grade of *C* or above only when permitted to do so by the department concerned, unless the course description states that the course may be repeated for credit. A written statement to this effect must be submitted for approval to the Dean's Office. It is then filed with the Registrar. A student taking School of Engineering and Applied Science courses may not repeat for credit a course in which he has received a grade of *C* or above, unless required to do so by the department concerned; a written statement requiring the student to repeat such a course for credit must be submitted to the Registrar by the appropriate department chairman.

INCOMPLETE / AUTHORIZED WITHDRAWAL

Whenever a grade has not been assigned, the symbol *I* (Incomplete) or the symbol *W* (Authorized Withdrawal) will be recorded. The symbol *I* indicates that a satisfactory explanation has been given the instructor for the student's failure to complete the required work of the course. At the option of the instructor, the grade of *I* may be recorded if a student, for reasons beyond his control, is unable to complete the work of the course, and if the instructor is informed of, and approves, such reasons before the date when grades must be reported. The grade may be used only if the student's prior performance and class attendance in the course have been satisfactory. Any failure to complete the work of a course which is not satisfactorily explained to the instructor before the date when grades must be turned in will be graded *F*. If acceptable

reasons are later presented to the instructor, he may initiate an
grade change. Although the grade of *I may* remain on the records
mum of one year, the instructor should normally set a much bri
within which the uncompleted work (usually the final examination, or
paper) must be made up. The grade of *I* cannot be removed by re
for the course here, or by taking its equivalent elsewhere. An "In
cannot be made up after the lapse of one calendar year except b
permission of the appropriate dean. An Incomplete which is not remo
in one calendar year is automatically changed to an *F*.

QUALITY-POINT INDEX*

Quality points are computed from grades as follows:

For each semester hour of the letter grade—*A*, 4 points; *B*, 3 poin
points; *D*, 1 point; *F*, no points.

Scholarship is computed in terms of the quality-point index. This is
dividing the total number of quality points by the total number of
hours for which the student has registered. Example: if a student rece
A in one three-credit course, and a *B* in another three-credit course, he
compute his quality-point index this way:

$A = 4 \times 3$ (semester hours) $= 12$
$B = 3 \times 3$ (semester hours) $= 9$

6 — 21 ÷ 6 = 3.5 quality-point index

Courses marked *W*, *I*, or *CR* are not considered in determining the
except that courses marked *I* will be considered when a formal grade
corded. Grades in courses taken at other institutions are not considere
computing the quality-point index.

WARNINGS

At stated intervals during the academic year students who are doing work o
grade or lower in courses with departmental numbers below 100 rece
"warnings." A "warning" constitutes notice to the student that he must con
his instructor and his adviser at the earliest opportunity. "Warning periods"
established during the seventh and eighth weeks of thirteen-week courses.
during the third and fourth weeks of six and a half week courses.

PROBATION

*Undergraduate Probation in the School of Government and Business Ad
ministration.*—A student must maintain a quality-point index of at least 2.0
or be placed on probation.

A student who has attempted 12 or more semester hours of work and who
cumulative quality-point index is between 1.50 and 2.00 is placed on probatio
for the period in which he attempts 12 additional semester hours of work.
his quality-point index is still below 2.00 at the end of his probationary period
he is suspended. The Committee on Scholarship reserves the right to exten
the period of probation even if the student has earned an average of above 2.0

* Not applicable to Columbian College of Arts and Sciences and the School of Engineering an
Applied Science.

A student placed on probation for a third period, whether successive or after an interval, is suspended.

Undergraduate Probation in Columbian College of Arts and Sciences.—A student who is not suspended or on probation is considered to be in good standing. A student* who in one semester receives two grades of *F* in courses carrying 3 or more semester hours of credit each, or the equivalent, is placed on probation. A student in his first semester on probation who receives one grade of *F* in such a course will be continued on probation for a second semester. Two grades of *D* will be treated as equivalent to one grade of *F* in assessing the student's probation status. A student on probation taking 12 or more semester hours whose grades are all *C* or better is removed from probation.

Graduate Probation in the School of Government and Business Administration.—A student who has attempted 6 or more semester hours and whose quality-point index is between 2.50 and 3.00 is placed on probation for the period in which he attempts 12 additional semester hours of work. If his quality-point index is still below 3.00 at the end of his probationary period, he is suspended. After probation is removed, a student's quality-point index again falls below 3.00, he is suspended.

SUSPENSION

Undergraduate Suspension in the School of Government and Business Administration.—A student who has attempted 12 or more semester hours of work and whose cumulative quality-point index is below 1.50 is subject to suspension; however, a student who has a quality-point index between 1.40 and 1.50 is considered by the Committee on Scholarship, which may retain him on probation or suspend him. A student who has attempted 6 or more semester hours of work and has a quality-point index of 1.00 or below is suspended.

Undergraduate Suspension in Columbian College of Arts and Sciences.—A student* who in one semester receives grades of *F* in three courses carrying 3 or more semester hours of credit each, or the equivalent, is suspended. A student in his first semester on probation who receives two or more grades of *F* in such courses is suspended. A student who receives one or more grades of *F* in such courses in any later semester on probation is suspended. Two grades of *D* will be treated as equivalent to one grade of *F* in assessing the student's suspension status.

An undergraduate student who is subject to probation for the third time, whether successive or after an interval, is suspended.

An undergraduate student suspended for poor scholarship cannot register for courses even as an auditor. He may apply for readmission after the lapse of either the fall or the spring semester. He must then submit evidence to the Committee on Scholarship that he is better qualified to pursue college work. A student suspended twice for poor scholarship will not be readmitted.

Graduate Suspension in the School of Education.—A student who receives

* The rules governing probation and suspension are applicable as stated to students enrolled for a full-time program (12 semester hours or more) during the fall or spring semester. Students enrolled for less than 12 semester hours during the fall or spring semester and students enrolled during the summer sessions are subject to probation or suspension on the basis of their record for 12 semester hours, or multiples thereof, rather than on their record in any one semester.

the grade of *C* in more than 6 semester hours of work is subject to suspen
A student who receives a grade of *F* must confer with the Dean of the Sc
of Education before enrollment for further work.

Graduate Suspension in the School of Government and Business Admin
tion.—A student who has attempted 6 or more semester hours of work
whose cumulative quality-point index is below 2.50 is suspended.

CHANGES IN PROGRAM OF STUDIES

DROPPING A COURSE OFF CAMPUS

A course may be dropped without academic penalty during the first third of
semester. Withdrawing from a course without academic penalty after the
third of the semester requires approval of a written request, accompanied b
completed drop slip, addressed to the Dean of the College of General Stud

Procedure for Dropping Courses.—An off-campus drop slip (obtainable fr
the instructor, or University representatives at the College of General Stud
must be completed, signed and dated by the instructor, and submitted to
College of General Studies. The effective date will be the date the instruc
signed the drop slip.

Failure to follow the proper procedure will result in an automatic grade o
and, regardless of the time of discontinuance, will not relieve the student
financial responsibility for the entire course.

DROPPING A CAMPUS COURSE

A *campus* drop slip (available at the Office of the Registrar) must be complete
signed and dated by the instructor, and submitted to the Office of Student Re
ords, College of General Studies.

Each college and school of the University sets deadline dates for each seme
ter concerning withdrawal.

All charges for courses dropped without the approval of the dean must b
met by the student. Reporting the dropping of a course to an instructor do
not constitute an official withdrawal.

TRANSFER WITHIN THE UNIVERSITY

Transfer of residence to the College of General Studies, as a degree candidate
from another college, school, or division of the University may be made on
with the approval of the deans concerned. Applications for transfer are avai
able at the University's Office of Admissions or at the office of the appropria
dean. Upon transfer the student should consult his faculty adviser as to the s
quirements he must fulfill.

A maximum of 42 semester hours is transferrable toward the Associate in
Arts in General Studies degree; a maximum of 90 semester hours is trans
ferrable toward a Bachelor's degree; a maximum of 18 semester hours is
transferrable toward a Master of Science in Administration degree; and a
maximum of 6 semester hours is transferrable toward the degree of Master
Arts in Special Studies, Master of Science in Forensic Science, or Master
Science in Special Studies. Students transferring within the University a
advised to note the residence requirements of the degree sought.

CREDIT

Credit toward a degree is given only after registration for and satisfactory completion of the required work of courses in the University, or upon the granting of advanced standing in accordance with the regulations of the College.

For transfer from credit to audit status, see page 22.

BALANCE SHEET

On request, the Registrar will issue to undergraduate degree candidates a balance sheet showing the amount of work completed and the requirements remaining to be met for the degree. A second balance sheet will be issued only in the event the student changes major or degree objectives.

TRANSCRIPTS OF RECORD

Official transcripts of student records will be issued on request of the student or former student. A fee of two dollars is charged for each transcript. No certificate of work done will be issued for a person who does not have a clear financial record.

CONTINUOUS REGISTRATION

Degree candidates are expected to maintain continuous registration until *all* degree requirements are satisfied (for "Leave of Absence" exception granted by the Graduate School of Arts and Sciences, see page 55). Students who have completed course registration (including the thesis) must maintain continuous registration by paying the "continuous registration" fee (see page 24). By failing to register for one semester or more, the student breaks his registration and must be readmitted (see "Readmission," page 21). A "Readmitted Student" is required to satisfy the curriculum requirements existing at the time of his readmission. The maintaining of continuous registration normally is limited to a period of one year.

Students must be registered during the summer if they are taking courses, are taking required examinations, are receiving guidance toward theses, or are expecting to graduate at the end of the Summer Sessions.

MILITARY LEAVE

A student called to active duty may be granted military leave for the period of active duty, upon presentation to his dean of a copy of his orders and a petition for such leave. The maintenance of "continuous registration" is not required of the student on military leave; however, he must apply for readmission to the University well in advance of the semester in which he expects to return. Payments for tuition and fees which are not refunded to the student at the time he is granted military leave will be maintained as a deferred credit for his account and use upon return to the University.

GRADUATION REQUIREMENTS

To be recommended for graduation a student must have met the admission requirements of his college or school; completed satisfactorily the scholarship, curriculum, residence, and other requirements for the degree for which he is registered; and be free from all indebtedness to the University. Registration, either

for course work or on the "continuous registration" fee basis, is requi
semester or summer session immediately preceding the awarding of t
For the Military Cooperative programs, which are on a different acad
schedule, registration in the last semester of the academic year of the
fulfills this requirement.

Application for Graduation.—An "Application for Graduation" form
filed and the appropriate fee paid at the time of registration for the last
or summer session of the senior or final year. Students completing d
quirements during the Summer Sessions will be awarded diplomas (n
convocation) September 30, *provided* they have completed all degree
ments and have applied for graduation as a part of registration for the
Sessions.

Scholarship.—The student must meet the scholarship requirements
particular degree for which he is registered.

Curriculum.—See the requirements for the degree concerned.

Residence.—A student is "in residence" only when registered for cours
after making application for admission to degree candidacy or for the 15
ter hours undertaken to qualify for degree candidacy (see the specific re
requirements for the degree concerned).

With the permission of the appropriate dean, a student may be grante
of absence; such student should, however, remain technically in reside
paying the continuous registration fee for each semester he is absent (i
ception granted by the Graduate School of Arts and Sciences, see page
For the purpose of this regulation, the summer session is disregarded.

Except for Master's degree candidates in the Graduate School of Arts
Sciences, the School of Education, and the School of Engineering and
plied Science, service personnel who receive military transfers when the
within 6 hours of a degree may, by special arrangements, be permitted to
plete their work elsewhere, transfer these credits to the College of General S
ies, and receive a degree from this University. This procedure does not app
Master's candidates who have been granted 6 hours of transferred credi
have not completed the required courses.

Attendance and Conduct.—The University reserves the right to refus
confer a degree upon a candidate whose attendance or conduct has been un
isfactory.

*Thesis**.—A thesis, submitted in partial satisfaction of requirements for
Master's degree, must be submitted in its final form to the appropriate dean
later than the date specified in the calendar. Two complete copies of e
thesis are required. It is the responsibility of the candidate for a graduate
gree to obtain from the College of General Studies a printed copy of the reg
tions governing the styling and reproduction of the thesis. These regulations
rigidly enforced (see page 57).

Accepted theses, with accompanying drawings, become the property of t
University and are deposited in the University Library, where the duplica
copies are bound and made available for circulation.

HONORS

Dean's List.—To be eligible for inclusion on the Dean's List, a student

* Applicable only to programs in the School of Government and Business Administration. Se
page 65 for *Thesis* in the School of Engineering and Applied Science, page 53 for *Thesis* in th
School of Education.

be a candidate for an undergraduate degree. Course work taken while the application for admission is being processed will be computed in determining eligibility for the Dean's List. A full-time degree candidate in the School of Government and Business Administration programs must have a minimum quality-point index of 3.50 for the semester concerned; a part-time degree candidate must have a quality-point index of 3.50 on the last 12 semester hours of work and must have maintained continuous registration for at least one three-hour course during the period concerned. Eligibility for inclusion again will be determined on the basis of the subsequent 12 semester hours of work. In Columbian College of Arts and Sciences degree programs, a student must have received grades of *A* in at least 60 per cent of the last 15 semester hours of work and no grades of *D* or *F*.

With Distinction.—The undergraduate degrees may be conferred "With Distinction," at the discretion of the Dean's Council of the College and the Committee on Scholarship if a student meets the following qualifications: in the School of Government and Business Administration programs he must attain a quality-point index of 3.50 or higher on all work taken at this University, or in Columbian College of Arts and Sciences programs he must have received grades of *A* in at least 60 per cent of the courses taken at this University.

To be eligible for this honor a student must have completed at this University at least one-half of the course work required for the degree.

Special Honors.—Special Honors may be awarded to any member of the graduating class for outstanding achievement in the student's concentration of work on recommendation of the major department, under the following regulations:

1. The student must have his candidacy for Special Honors approved by the faculty member representing the major department or concentration no later than the beginning of the senior year.
2. The student must meet such other conditions as may be set at the time his candidacy is approved.
3. No student will be awarded Special Honors unless he meets the following qualification: in the School of Government and Business Administration programs he must have achieved a quality-point index of at least 3.00 on all work taken at this University, or in Columbian College of Arts and Sciences programs he must have earned grades *A* or *B* in 50 per cent of the courses taken at this University.
4. To be eligible for honors a student must have completed at this institution at least one-half of the academic course work required for the degree.

DISHONESTY

If a student knowingly makes a false statement or conceals material information on an application for admission, registration card, or any other University document, his registration may be cancelled. If such falsification is discovered after the student has established an academic record at the University, he may be subject to dismissal from the University. Such a student will be ineligible (except by special action of the Dean's Council) for subsequent registration in any unit of the University.

Academic dishonesty on the part of any student will result in a disciplinary grade of *F* for the course involved and also may, upon the recommendation of the Dean's Council, result in his suspension from the University for a stated

period, at the end of which time he may petition for readmission. proval of the Dean's Council, the disciplinary grade of "Failure— Dishonesty" will be recorded for the course involved, and this grad employed in the computation of the quality-point index or academic A student so suspended shall be withdrawn from all other courses exc in which all work has been completed.

THE LIBRARY

A student registered in the College of General Studies is entitled to th the University Library. A permit form for library privileges is issued student. A borrower's card may be obtained by presenting the permit the Circulation Desk of the Library.

The loan period for most books available for outside circulation is A fine of 25 cents is charged for each day a book is overdue. Any book circulates is subject to recall by the Library if needed for reserve or oth Reserve books must be used in the reserve reading room when the Lib open, except that they may be withdrawn for overnight use beginning a p.m. A fine of 50 cents is charged for each hour or fraction thereof reserve book is overdue. Grades of a student are withheld until his record is clear.

All students using the University Library are expected to be familiar w detailed regulations, available on application to any of the Library's S desks.

The hours of the University Library are Monday through Friday, 8:30 to 12 midnight; Saturday, 9 a.m. to 6 p.m.; Sunday, 1 p.m. to 12 midnig

RIGHT TO DISMISS STUDENTS

The right is reserved by the University to dismiss or exclude any student f the University, or from any class or classes, whenever, in the interest of student or the University, the University Administration deems it advisabl do so.

RIGHT TO CHANGE RULES

The University and its various colleges, schools, and divisions reserve the ri to modify or change requirements, rules, and fees. Such regulations shall into force whenever the proper authorities may determine.

RIGHT TO MAKE CHANGES IN PROGRAMS

The right is reserved by the University to make changes in programs witho notice whenever circumstances warrant such changes.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 145–47) contains regulations recently approved by the University's Board of Trustees.

UNIVERSITY POLICY ON RELEASE OF STUDENT INFORMATION

In general, the policy of the University is one of attempting to keep the stu

dent's record confidential and out of the hands of those who would use it for other than legitimate reasons. At the same time, the policy must be flexible enough not to hinder the student, the University, or the community in their legitimate endeavors.

No information concerning a student will be released except as noted below:

1. Information such as whether or not the student is currently enrolled; dates of attendance; verification of date and place of birth; degrees earned, if any, date, major field or area of concentration, and honors received; home and local addresses and telephone numbers; school, college, or division of enrollment, and class; verification of signature; name and address of parent or guardian.

2. The issuance of formal transcripts of record to recognized institutions of higher learning; the certification of academic achievement to the various recognized professional associations (law, medicine, engineering, education, etc.).

Additional information will be released only on written authorization from the student, or by court order or subpoena. If a subpoena is served, the student whose record is being subpoenaed will be notified and the subpoena will be referred to the University's legal counsel.

Government investigative agencies have no inherent right to access to student files and records. If expressly requested, properly identified representatives from federal, state, or local government agencies may be given the information listed under No. 1 above.

UNIVERSITY POLICY ON SELECTIVE SERVICE INFORMATION

The University notifies draft boards of a student's academic status only when the student requests or authorizes, in writing, that the draft board be notified. An undergraduate student desiring certification for the Selective Service System must go to the Registrar's Office and complete the Selective Service Information Card which authorizes the University to notify his draft board of his full-time enrollment. It is the student's obligation to complete this card if he wants his draft board to know that he is registered as a full-time student.

By my signature below, I hereby authorize the University to notify my draft board of my academic status in the University, or of any changes in academic status that occur during this semester.

National Law Center students and students in the School of Medicine should check with the appropriate dean's office for details of the policy in their school.

Student Services

HONOR SOCIETIES

Alpha Sigma Lambda.—A National honor society for part-time evening college and off-campus undergraduate degree students, the purpose of which is to recognize and to encourage scholarship and leadership among undergraduate degree candidates. Membership is limited to students who have been enrolled for four semesters or terms in the College of General Studies and have completed 30 semester hours of work toward a degree with a 3.50 average, or

equivalent. The Alpha Alpha Chapter was established at George Washington University in 1965.

Phi Beta Kappa.—Undergraduate degree candidates in the College of General Studies programs are eligible for membership in Phi Beta Kappa, national scholarship honorary society. The society recognizes "outstanding intellectual capacity well employed" in the field of liberal arts and sciences. Senior and junior students who are candidates for the degree of Bachelor of Arts, Bachelor of Science, or Bachelor of General Studies in Columbian College, and who have shown broad cultural interests, distinguished scholarly achievement, high character, general promise, and scholarly ideals may, to a number not exceeding ten per cent of a class, be elected to membership by the faculty members of the Alpha Chapter of the District of Columbia. Seniors and juniors in other schools of the University who meet the above requirements are also eligible for consideration for membership, provided that their program of studies includes appreciable work in the liberal arts.

COUNSELING

Students in the off-campus programs may obtain educational counseling and assistance in program planning through the Office of Counseling and Information Services or from University representatives at the various off-campus centers. The Office of Counseling and Information Services coordinates student personnel services, including academic counseling, vocational guidance as related to educational programs, and liaison with other University departments and services, as well as serving as a resource center for information on tuition assistance available to students in the College of General Studies programs. Appointments may be made by calling the College of General Studies, telephone 676-7069, or through the Education Director at locations where courses are scheduled. University counselors are also available at all locations during announced registration periods and at scheduled times each month.

UNIVERSITY BOOKSTORE

Textbooks may be ordered by mail from the University Bookstore. Forms for this purpose are available at registration. The hours of the Bookstore are Monday through Thursday from 8:45 a.m. to 6:30 p.m.; Friday from 8:45 a.m. to 5 p.m. Each semester the Bookstore will be open on the Saturday of Registration and the following three Saturdays from 9 a.m. to 1 p.m.

The Bookstore is located in the Cloyd Heck Marvin Center building, 800 21st Street, N.W.; telephone 676-6870.

VETERANS EDUCATION

The Office of the Registrar, Luther Rice Hall, 2121 Eye Street, N.W., assists students entitled to educational benefits as veterans or war orphans with any problems which may arise concerning their benefits. This Office also processes certifications of enrollment and attendance to the Veterans Administration so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or war orphans should consult the Office of the Registrar prior to submitting application to the Veterans Administration. All such students should obtain the instruction sheet issued by the Office of the Registrar, which sets forth requirements to be

fulfilled before certification of enrollment can be made to the Veterans Administration, and which includes other information of general interest.

The Veterans Administration is at 2033 M Street, N.W., Washington, D.C. 20421.

STUDENT AND ALUMNI CAREER SERVICES OFFICE

The Student and Alumni Career Services Office, Woodhull House, 2033 G Street, N.W., provides assistance to degree-seeking students and alumni seeking full-time, part-time, temporary, or permanent employment.

Counseling concerning trends in employment, areas of employment, various test and examination announcements, preparation for job interviews, resume-writing, and other procedures for successful job application are always available. Specific career openings; an on-campus recruitment program by business, industry, government, and school systems; volunteer opportunities; and part-time and temporary jobs for students while attending school are all part of this service. Referral and placement functions of the on-campus College Work-Study Program are handled by the Student and Alumni Career Services Office. Teacher credential files initiated by persons seeking employment in all educational fields are maintained in this Office.

An understanding and knowledgeable approach to avenues of service for those people who do not find career satisfaction in the structured systems of business, government, and education is also provided in the Student and Alumni Career Services Office.

Continuing Education for Women

MANY WOMEN wish to resume their education on a part-time basis when homemaking responsibilities permit. They feel the need to return to the classroom to update their education, prepare for new careers, participate more effectively in community affairs, or enrich their own lives through a sense of personal growth. The Continuing Education for Women program has been developed to meet these needs.

To help women focus their interests and achieve their goals, Continuing Education for Women offers (1) a group guidance course, *Developing New Horizons for Women*, (2) off-campus credit courses at hours and locations convenient for women, (3) selected noncredit courses, (4) academic counseling for women entering degree and nondegree programs in the College of General Studies, and (5) referral to other colleges within the University.

For further information, contact Ruth H. Osborn, Assistant Dean of the College of General Studies, for Continuing Education for Women, or Abbie O. Smith, Assistant Director of Continuing Education for Women, College of General Studies, telephone 676-7036.

DEVELOPING NEW HORIZONS FOR WOMEN

Developing New Horizons for Women is offered each semester to help women develop their potential through understanding themselves as individuals and as women; to gain confidence in their abilities; and to become acquainted with educational, occupational, and community service opportunities. There are no

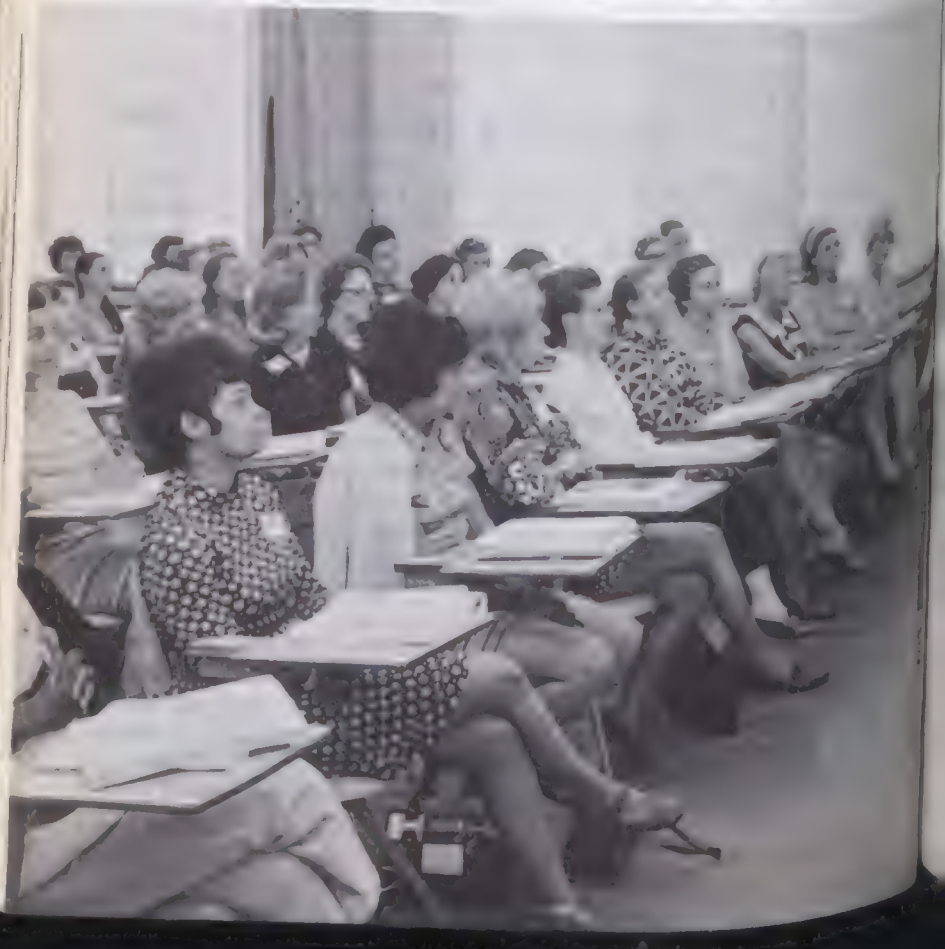
prerequisites for this course. Most of the women who enroll are homema with school-age children. They range in age from 19 to 64. Although so have no previous college education, approximately one-half have Bachelo degrees, and others have earned graduate degrees. More than 2,000 wom have completed this program since it was originated at George Washingto University in 1964.

Developing New Horizons for Women, a 15-week noncredit course, includ lectures, group discussions, guest speakers, psychological testing, and individ ual counseling. Participants attend class one day a week from 10 a.m. t 12:30 p.m. One section meets on campus and other sections meet in nearb Maryland and Virginia. During the final five weeks all sections meet on campu to hear guest speakers.

After completing this course, approximately one-half of the women enroll some type of educational program at George Washington University or other colleges and universities. Others obtain jobs or find opportunities for sig nificant volunteer service. Some combine part-time study with part-time em ployment.

OFF-CAMPUS CREDIT COURSES

To enable women with home responsibilities to continue their formal education the College of General Studies offers credit courses off campus. These courses



which may be taken for undergraduate or graduate credit, meet at hours and locations convenient for homemakers. Classroom space has been provided by churches and community centers in Alexandria, Annandale, Arlington, Falls Church, McLean, Reston, and Springfield in Virginia; Bethesda, Chevy Chase, Kensington, Rockville, and Takoma Park in Maryland; and in the District of Columbia.

Except for Education courses which meet for three hours a week, each course meets once a week for two and one-half hours during the day when children are in school. Although many women take these courses to meet requirements for degree programs, they can also be accepted in a nondegree status. Many who successfully complete off-campus credit courses as nondegree students are encouraged to apply for degree candidacy at George Washington University. Other women need only specific courses to qualify for positions in business or government; some who already hold academic degrees wish to qualify for professional certification in such fields as teaching or guidance. Many students in this program have had credits transferred to other colleges and universities throughout the country.

In some cases government and industry have granted leave for employed women to enroll in the daytime credit courses, particularly where the courses are job-related.

NONCREDIT COURSES

Selected noncredit courses which supplement the academic programs of the University are offered through Continuing Education for Women. Courses offered during 1971–72 included: *Consumer Education Workshop, Foundations of Editorial Work, How to Study, International Affairs Lecture Seminar, Introduction to Creative Thinking, Introduction to Library Science, Introduction to Social Work, Mathematics Refresher, Oral History Workshop, The Newly Single Woman, Understanding Southeast Asia, Window into the Far East,* and *Writing and Illustrating Children's Books.*

Each course met for two hours once a week for ten weeks. Additional courses to meet the needs of adult women are planned for 1972–73.

ACADEMIC COUNSELING

The professional staff of Continuing Education for Women counsels women interested in enrolling in degree and nondegree programs in the College of General Studies. Counselors are available at dates and locations indicated for registration. Appointments can also be made for individual or group counseling at the Office of Continuing Education for Women, 2029 K Street, N.W.

The Continuing Education for Women program was originated for women; however, men are welcome to enroll in the daytime credit and noncredit courses.

For further information about the programs of Continuing Education for Women, telephone 676-7036, or write to Continuing Education for Women, College of General Studies, 2029 K Street, N.W., Washington, D.C. 20006. Descriptive brochures and semester course schedules are available.

DEGREE PROGRAMS

Undergraduate Degrees

THE FACULTY of Columbian College of Arts and Sciences has academic jurisdiction over the degrees of Associate in Arts in General Studies; Bachelor of General Studies with areas of concentration in history, mathematics, political science, and psychology; Bachelor of Science in Environmental Health; Bachelor of Science in Geodetic and Cartographic Science; and Bachelor of Science in Oceanography. The Faculty of the School of Government and Business Administration has academic jurisdiction over the degree of Bachelor of Science in Administration with areas of concentration in accounting and business administration. These off-campus programs are administered by the College of General Studies.

ADMISSION

For detailed information see "Admission as a Degree Candidate," pages 16–17, and "Undergraduate Degree Candidacy," pages 17–19.

REQUIREMENTS FOR THE ASSOCIATE IN ARTS IN GENERAL STUDIES DEGREE

RESIDENCE

The last 18 semester hours in the Associate in Arts in General Studies degree program must be completed in residence as a candidate for this degree. A portion of the academic work taken to qualify for degree candidacy (see page 17) may be accepted in partial satisfaction of the residence requirement, if the courses are approved as part of the student's degree program.

REQUIREMENTS FOR THE BACHELOR'S DEGREES

RESIDENCE

The last 30 semester hours, including at least 12 hours in the area of concentration, must be completed in residence as a candidate for the degree sought unless special permission is granted by the appropriate dean to take work elsewhere. This requirement applies to students transferring within the University as well as to students transferring from other institutions. The 15 hours taken

in order to be considered for degree candidacy may be counted in residence. For regulations governing military students who are transferred when they are within 6 semester hours of their degrees, see page 34.

Transfers.—Transfer students from other colleges or universities must complete satisfactorily at least 12 semester hours of the required work in their area of concentration in residence as a candidate for the degree sought.

ASSOCIATE IN ARTS IN GENERAL STUDIES

Faculty Adviser: Edson G. Hammer, College of General Studies; Building F, Room 5A, Telephone 676-7016.

Upon the satisfactory completion of the requirements set by Columbian College of Arts and Sciences, the degree of Associate in Arts in General Studies is conferred. Students who plan to continue working toward an off-campus Bachelor's degree offered by Columbian College must apply to the Dean upon completion of the requirements for the degree of Associate in Arts in General Studies. Forms for this purpose are available at the College of General Studies.

After completing the requirements for the degree of Associate in Arts in General Studies, students may wish to transfer to an on-campus degree program within the University, or they may wish to transfer to another institution. However, modifications in admission, advanced standing, and curriculum requirements permitted in the Associate in Arts in General Studies degree program may not be accepted in transfer. Therefore, while registered for this degree, students should meet the requirements of the college, school, or university to which they wish to transfer. The entrance requirements of the colleges and schools of the University are stated in this catalogue and in the *Undergraduate and Graduate Catalogue* of the University.

Scholarship.—The system of grading is described on pages 29–30. For regulations concerning probation, suspension, and readmission, see pages 30–31.

CURRICULUM

The satisfactory completion of 60 semester hours of college work in the following curriculum, is required. Students who plan to pursue a Bachelor's degree are advised to plan their Associate's program so that they will satisfy the prerequisites to the degree of their choice.

	Semester Hours
Communications	
Engl 1 or 1x, 2	6
Sp&D 1 or 111	3
Humanities	
Nine semester hours selected from the following: Art 31–32, 71–72; Engl 43–44, 45–46, 51–52, 71–72, 91–92; Mus 3, 4; Phil 50; Rel 9, 10, 59–60....	9
Natural and Mathematical Sciences	
Nine semester hours selected from the following: B Sc 3–4, 11–12; Chem 3–4; Geol 1–2, 3, 4; Phys 1, 2, 9–10; Math 3, 6, 9, 10, 30, 31; Ocea 101–2; Stat 51, 52, 101–2	9

Social Studies

Nine semester hours are required, each course chosen from one of two de
partments, selected from the following: AmCv 71–72; Anth 1–2; Econ 1–2
Geog 51 and 52; Hist 39–40, 71–72; P Sc 4 or 5, 6; Psyc 1, 8, 22, 29; So
1, 2 .....

Elective (recommended Mgt 118 and 119).....

Total .....

BACHELOR OF GENERAL STUDIES

Faculty Adviser: Edson G. Hammer, College of General Studies; Building F,
15A, Telephone 676-7016.

The Bachelor of General Studies curriculum aims to provide the adult pa
student with the opportunity to obtain a broad education. For that reas
course work required in the first and second years is distributed among
munications (written and oral), the Humanities, Natural and Mathematic
ences, and the Social Studies. In choosing the third- and fourth-year
work required in departments related to their concentration, students s
obtain counseling through the faculty adviser.

Students planning to work toward Master's degrees are advised to plan
Bachelor's programs so that they will meet the prerequisite requirements
school or college of their choice. Students planning to enter graduate pro
which require a reading knowledge of a foreign language are advised to in
two years of one foreign language in their Bachelor's program.

Scholarship.—To remain in good standing and to qualify for graduati
student must maintain grades of *B* or *A* in half courses taken in the sel
area of concentration.

The system of grading is described on pages 29–30. For regulations
cerning probation, suspension, and readmission, see pages 30–31.

FIRST AND SECOND YEARS

Communications

Engl 1 or 1x, 2.....
Engl 11; Sp&D 111 or 121.....

Humanities*

Twelve semester hours selected from the following: Art 31–32, 71–72; Engl
43–44, 45–46, 51–52, 71–72, 91–92; Foreign Language (2 years of one lan-
guage); Mus 3 and 4; Phil 50; Rel 9 and 10, 59–60; Slav 91–92.....

Natural and Mathematical Sciences

Six to eight semester hours selected from the following: B Sc 3–4, 11–12;
Chem 3–4; Geol 1–2, or 3 and 4; Ocea 101–2; Phys 1 and 2, or 9–10...
Six semester hours selected from the following: Math 3, 6, 9, 10, 30, 31;
Stat 51, 52, 101–2.....

* Students who plan to continue study for advanced degrees are urged to fulfill the 2-year langu
option.

Social Studies	Semester Hours
Twelve semester hours selected from two of the following combinations: AmCv 71–72; Anth 1–2; Econ 1–2; Geog 51 and 52; Hist 39–40; Hist 71–72; P Sc 4 and 6; P Sc 5 and 6; Psyc 1 and 8; Psyc 1 and 22; Psyc 1 and 29; Soc 1 and 2	12
Elective (depending on science option)	10–12
	60

THIRD AND FOURTH YEARS

Concentrations are offered in History, Mathematics, Political Science, and Psychology.

Concentration Requirements (to be selected in consultation with the faculty adviser):

100-level courses in the department of the selected area of concentration	24*
100-level courses in two or more related departments	18*
Elective	18
Total	120

BACHELOR OF SCIENCE IN ADMINISTRATION

Faculty Advisers: Robert A. Oliver, Instructor in Business Administration, Government 105, Telephone 676-7154; or Walton E. Smith, Associate Professor of Management Science, Government 105, Telephone 676-7159.

The Bachelor of Science in Administration curriculum aims to provide the adult part-time student with the opportunity to obtain a broad education in preparation for careers in accounting or business administration. The course work required in the first and second years is distributed among Communications (written and oral), the Humanities, Natural and Mathematical Sciences, the Social Studies, and Business and Economics. In choosing the third- and fourth-year course work required in departments related to their concentration, students should obtain counseling through the faculty adviser.

Students planning to work toward Master's degrees are advised to plan their Bachelor's programs so that they will meet the entrance requirements of the school or college of their choice.

SCHOLARSHIP

The system of grading and computing scholarship is described in detail on pages 29–30. For regulations concerning probation, suspension, and readmission, see pages 30–31.

To remain in good standing and to qualify for graduation, a student must maintain a general quality-point index of 2.00 and a quality-point index of at least 2.50 in his area of concentration.

* Students selecting psychology as an area of concentration are required to take 18 semester hours of 100-level Psychology courses and 24 semester hours of 100-level courses in two or more related departments.

FIRST AND SECOND YEARS

	Semester Hours
Communications	
Engl 1 or 1x, 2	6
Humanities	
Six semester hours selected from the following: Art 31; Engl 51–52, 71–72, 91–92; Foreign Language (1 full year of a foreign language); Mus 3; Phil 50	6
Natural and Mathematical Sciences	
Six to eight semester hours selected from the following: B Sc 3–4; Chem 3–4; Geog 51 and 52; Geol 1–2, or 3 and 4; Phys 1 and 2, or 9–10	6–8
Math 30, 31	6
Stat 51 or 101	3
Social Studies	
Psyc 1, 8	6
Six semester hours selected from the following: Anth 1, Hist 71–72, P Sc 4 or 5, 6; Soc 1	6
Business and Economics	
Acct 1–2* or 115	3–6
B Ad 51	3
Econ 1–2	6
Elective	4–9
	60

THIRD AND FOURTH YEARS

Concentrations are offered in Accounting and Business Administration.

Required Courses—Accounting Concentration	
Acct 101, 121, 161, 171, 181	15
B Ad 102, 105, 131, 141, 161, 181, 198	21
Econ 121	3
Mgt 118	3
Psyc 144	3
Elective (To be selected from Accounting, Business Administration, or Economics)	9
Elective (To be selected in consultation with the Faculty Adviser)	6
Total	120

Required Courses—Business Administration Concentration	
Acct 193	3
B Ad 101, 102, 105, 131, 141, 161, 181, 198	24
Econ 121	3

* Students selecting Accounting as an area of concentration should elect Acct 1–2.

	Semester Hours
Mgt 118	3
Psyc 144	3
Elective (To be selected from Business Administration or related departments such as Accounting or Economics)	12
Elective (To be selected in consultation with the Faculty Adviser)	12
Total	120

BACHELOR OF SCIENCE IN ENVIRONMENTAL HEALTH

Faculty Advisers: First two years—Edson G. Hammer, College of General Studies; Building F, Room 15A, Telephone 676-7016. Third and fourth years—J.W. Millar, Vivian Gill Professor of Epidemiology and Environmental Health, School of Medicine, Telephone 331-6117.

The Bachelor of Science in Environmental Health curriculum is designed to provide students with the requisite training to function effectively as Environmental Health Officers in domestic and foreign areas. Candidates are prepared for participation in community or regional program planning, community education, staff personnel training, and supervision in official or voluntary health organizations.

Entrance requirements are stated on pages 16–19; residence requirements on pages 42–43.

The determination of acceptability of a student to the program leading to the degree of Bachelor of Science in Environmental Health will be made by the faculty advisers appointed by the Department of Epidemiology and Environmental Health and Columbian College of Arts and Sciences. The decision to accept a student must be unanimous. The degree is granted by Columbian College of Arts and Sciences and is administered by the College of General Studies.

Scholarship.—To remain in good standing and to qualify for graduation, a student must maintain grades of *B* or better in half the courses taken in the major area of concentration.

The system of grading is described on pages 29–30. For regulations concerning probation, suspension, and readmission, see pages 30–31.

FIRST AND SECOND YEARS

Communications

	Semester Hours
Engl 1 or 1x, 2	6
Engl 11; Sp&D 111 or 121	6

Humanities

Twelve semester hours selected from the following: Art 31–32, 71–72; Engl 43–44, 45–46, 51–52, 71–72, 91–92; Foreign Language (2 years of one language); Phil 50	12

	Semester Hours
Natural and Mathematical Sciences	
B Sc 11–12, Chem 11–12	16
Six semester hours selected from the following: Math 3, 6, 9, 10, 30, 31; Stat 51–52, 101–2	6
Social Studies	
Six semester hours selected from one of the following combinations: Anth 1–2; Econ 1–2; Psyc 1 and 8; Psyc 1 and 22; or Soc 1 and 2	6
*Elective (Epid 1, 2, and 3 recommended)	8
	60

THIRD AND FOURTH YEARS

Concentration Requirements (to be selected, in consultation with the adviser, from the following Epidemiology and Environmental Health courses)	25

Environmental Sanitation—Epid 101, 102, 103, 104
Public Health Epidemiology—Epid 121, 122, 123, 131
Public Health Entomology—Epid 141, 142, 143, 144
Public Health Microbiology—Epid 151, 152, 153, 154
Occupational Health—Epid 171, 172
Public Health Administration—Epid 191, 192

Elective	
100-level courses in two or more related departments in consultation with the faculty adviser, selected from Anthropology, Biological Sciences, Chemistry, Geology, Psychology, and Sociology	35
	120
Total	

BACHELOR OF SCIENCE IN GEODETIC AND CARTOGRAPHIC SCIENCE

Faculty Adviser: Hyman Orlin, Professorial Lecturer in Geodetic and Cartographic Science; Telephone 946-3557. Counseling by appointment only, Telephone 676-7013.

The course work in this four-year curriculum is offered on and off campus. The Cartography, Geodesy, Geophysics, and Oceanography courses are given at the National Oceanic and Atmospheric Administration, the Naval Oceanographic Office, the U.S. Army Topographic Command, and at other locations not too distant from the campus.

Entrance requirements are stated on pages 16–19; residence requirements are stated on pages 42–43.

ADVANCED STANDING

For advanced standing information, see pages 17–19. *Note that no credit will be given for correspondence courses or courses taken in service schools.*

* Electives selected with the approval of the adviser.

CHOLARSHIP

The system of grading is described on pages 29–30. For regulations regarding probation, suspension, and readmission, see pages 30–31.

To remain in good standing and to qualify for graduation, a student must maintain grades of *B* or better in half of the courses taken in one of the two areas of concentration: (1) *Cartography*—Cart 103, 104, 111, 112, Geod 110, Geop 105; (2) *Geodesy*—Geod 110, 155, 156, 160, 161, Geop 105.

CURRICULUM

		Semester Hours
	Required—First Year	
Cart 1–2:	Introduction to Cartography	6
Engl 1:	English Composition: Language as Communication	3
Engl 2:	English Composition: Language and the Arts and Sciences	3
Math 30:	Precalculus	3
Math 31:	Calculus of One Variable	3
Phys 1:	General Physics	4
Phys 2:	Introduction to Modern Physics	4
Social Studies:	To be selected from the following	6
AmCv 71–72:	Introduction to American Civilization	
Anth 1–2:	Introductory Anthropology	
Econ 1–2:	Principles of Economics	
Geog 51:	Introduction to Geography	
Geog 52:	World Regional Patterns	
Hist 39–40:	European Civilization in Its World Context	
P Sc 4 or 5, 6	Introduction to Political Science	
Soc 1:	Introductory Sociology	
Soc 2:	American Social Problems	
		32
	Required—Second Year	
Cart 107:	Physiography	3
Chem 11–12:	General Chemistry	8
Engl 51–52:	Introduction to English Literature, or	
Engl 71–72:	Introduction to American Literature	6
Geod 12:	Plane Surveying	3
Geod 13:	Geodetic Surveying	3
Geol 1 or 3:	Introductory Geology	3
Math 32:	Calculus of Several Variables	3
Math 33:	Calculus of Vector Functions	3
		32
	Required—Third Year	
Geod 17:	Elementary Photogrammetry	3
Geod 18:	Intermediate Photogrammetry	3
Geod 110:	Map Projections	3
Geop 105:	Elementary Geophysics	3
Ocea 101–2:	Elementary Oceanography	6
Other Courses:	Six semester hours to be selected from the following	6
Art 31–32:	Survey of Western Art	
Art 71–72:	Introduction to the Arts in America	
Mus 3:	Introduction to Musical Understanding	

		Semester Hours
Mus 4:	Survey of Music Literature	
Phil 50:	Introduction to Philosophy	
Rel 9:	The Old Testament	
Rel 10:	The New Testament	
Rel 21:	Introduction to Religious Thought	
Rel 59–60:	History of Religions	
Elective:	(Selected in consultation with the adviser)	8
		30

Group Options

Two areas of specialization are open to students in this program; students select one at the beginning of the fourth year.

Required—Fourth Year

GROUP I: CARTOGRAPHY

Cart 103–4:	Photo Interpretation	6
Cart 111:	Cartographic Techniques	3
Cart 112:	Advanced Cartography	3
Elective:	(Courses in Cartography, Geodesy, Geophysics, and Oceanography selected in consultation with the adviser)	14
	Total	120

GROUP II: GEODESY

Geod 155:	Elementary Geodesy	3
Geod 156:	Geodetic Astronomy	3
Geod 160:	Mathematics of Adjustments and Least Squares	3
Geod 161:	Adjustments in Geodesy and Photogrammetry	3
Elective:	(Courses in Cartography, Geodesy, Geophysics, and Oceanography selected in consultation with the adviser)	14
	Total	120

BACHELOR OF SCIENCE IN OCEANOGRAPHY

Faculty Adviser: Hyman Orlin, Professorial Lecturer in Geodetic and Cartographic Science; Telephone 946-3557. Counseling by appointment only, Telephone 676-7013.

The course work in this four-year curriculum is offered on and off campus. The Cartography, Geodesy, Geophysics, and Oceanography courses are given at the National Oceanic and Atmospheric Administration, the Naval Oceanographic Office, the U.S. Army Topographic Command, and at other locations not too distant from the campus.

Entrance requirements are stated on pages 16–19; residence requirements are stated on pages 42–43.

ADVANCED STANDING

For advanced standing information, see pages 17–19. *Note that no credit will be given for correspondence courses or courses taken in service schools.*

SCHOLARSHIP

The system of grading is described on pages 29–30. For regulations concerning probation, suspension, and readmission, see pages 30–31.

To remain in good standing and to qualify for graduation, a student must maintain grades of *B* or better in half of the following courses: Geop 105; Ocea 101–2; and 9 semester hours selected from Ocea 110, 111, 112, 113, 114, 115.

CURRICULUM

	Required—First Year	Semester Hours
Cart 1–2:	Introduction to Cartography	6
Engl 1:	English Composition: Language as Communication	3
Engl 2:	English Composition: Language and the Arts and Sciences	3
Math 30:	Precalculus	3
Math 31:	Calculus of One Variable	3
Phys 1:	General Physics	4
Phys 2:	Introduction to Modern Physics	4
Social Studies:	To be selected from the following	6
AmCv 71–72:	Introduction to American Civilization	
Anth 1–2:	Introductory Anthropology	
Econ 1–2:	Principles of Economics	
Geog 51:	Introduction to Geography	
Geog 52:	World Regional Patterns	
Hist 39–40:	European Civilization in Its World Context	
P Sc 4 or 5, 6:	Introduction to Political Science	
Soc 1:	Introductory Sociology	
Soc 2:	American Social Problems	
		32

	Required—Second Year	
B Sc 11–12:	Introduction to Biology for Science Majors	8
Engl 51–52:	Introduction to English Literature, or	
Engl 71–72:	Introduction to American Literature	6
Geol 1 or 3:	Introductory Geology	3
Geol 2 or 4:	Introductory Geology	3
Math 32:	Calculus of Several Variables	3
Math 33:	Calculus of Vector Functions	3
Ocea 101–2:	Elementary Oceanography	6
		32

	Required—Third and Fourth Years	
Cart 107:	Physiography	3
Cart 108:	Climatology	3
Chem 11–12:	General Chemistry	8
Geop 105:	Elementary Geophysics	3
Oceanography:	To be selected from the following	15
Ocea 11:	Navigation	
Ocea 110:	Physical Oceanography	
Ocea 111:	Ocean Waves and Tides	
Ocea 112:	Biological Oceanography	
Ocea 113:	Marine Geophysics	
Ocea 114:	Chemical Oceanography	

		Semester Hours
Ocea 115:	Geological Oceanography	
Other Courses:	(Courses in Biological Sciences, Chemistry, Geology, Geophysics, Oceanography, and Physics, selected in consultation with the adviser)	18
Elective:	To be selected from the following	6
Art 31–32:	Survey of Western Art	
Art 71–72:	Introduction to the Arts in America	
Mus 3:	Introduction to Musical Understanding	
Mus 4:	Survey of Music Literature	
Phil 50:	Introduction to Philosophy	
Rel 9:	The Old Testament	
Rel 10:	The New Testament	
Rel 21:	Introduction to Religious Thought	
Rel 59–60:	History of Religions	
	Total	120

Graduate Degrees

MASTER OF ARTS

THE DEGREE OF MASTER OF ARTS with a field in Religion and Medical Care is a new degree program offered by the Graduate School of Arts and Sciences under the direction of the Department of Religion. Although certain courses in this program are offered only through the College of General Studies' off-campus centers, candidates for this degree must register as a campus degree candidate in the Graduate School of Arts and Sciences.

The program of study is interdisciplinary and combines both professional and academic work. The intent of the program is (1) to provide training in an academic graduate milieu of chaplains and clergymen whose professional effectiveness might be increased through the combination of clinical experience and academic study; (2) to provide a program of study for those medical students who have a sense of the significance of theological insights for the care of the whole man and who desire to combine their medical education with this correlative study; and (3) to provide a program of research and study in the area of religion and medical care for those whose theological training (e.g., in ethics or sociology of religion) and interest are directed toward a vocation in teaching. Support for the program comes from (1) Clinical Training programs of the National Naval Medical Center, National Institutes of Health, and Walter Reed General Hospital; and (2) the departments of Health Care Administration, Psychology, Religion, Sociology, and departments of the School of Medicine.

The program of study leading to the degree of Master of Arts in the field of Religion and Medical Care consists of 36 semester hours of approved course work with or without a thesis and the passing of a Master's Comprehensive Examination.

For information concerning admission requirements and the specific requirements for the degree, contact the Graduate School of Arts and Sciences or the Chairman of the Department of Religion.

MASTER OF ARTS IN EDUCATION

The School of Education has academic jurisdiction over the degree of Master of Arts in Education. This off-campus degree program is designed for teachers who wish to increase their knowledge of professional and academic information and to prepare for special types of educational service.

The Master of Arts in Education degree programs offered at off-campus centers are available in the following fields: elementary administration; elementary education; higher education; human resource development; secondary administration; secondary education; special education—crisis/resource teaching, diagnostic-prescriptive teaching, early childhood special education; and supervision and human relations.

ADMISSION

For detailed information see "Admission as a Degree Candidate," pages 16–17, and "Master's Degree Candidacy," pages 19–21.

REQUIREMENTS FOR THE DEGREE

The program of study consists of either 33 or 36 semester hours of course work, depending upon the chosen field. The thesis (equivalent to 6 semester hours) is optional.

RESIDENCE

Advanced standing is granted for approved courses taken at other accredited institutions; however, a minimum of 30 semester hours must be completed while registered as a Master's degree candidate at this University.

SCHOLARSHIP

A quality-point index of 3.00 is required for graduation. Students who receive a grade of *C* in more than two courses are subject to suspension. Students who receive a grade of *F* must confer with the Dean of the School of Education before enrollment for further work.

THE THESIS

Students who elect a thesis must register on campus for Educ 299–300. The choice of the thesis subject must be approved in writing by the student's adviser and filed in the Office of the Dean. A statement of the School of Education standards for the thesis and printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the Dean.

Payment of tuition for the thesis entitles the candidate, during the period of registration, to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, an additional calendar year may be granted without further tuition payment. The student must, however, maintain continuous registration (see page 33) during this period. If the preparation of the thesis extends beyond the additional calendar year, the student must register for the entire 6 hours of thesis again and pay tuition as for a repeated course.

MASTER'S COMPREHENSIVE EXAMINATION

In addition to the course examinations, the candidate must pass a special hour examination on his area of specialization. Candidates for the examin must be registered for the semester it is to be taken, and must file a w application in the Office of the School of Education no later than thirty prior to the date of the examination.

MASTER OF ARTS IN SPECIAL STUDIES AND MASTER OF SCIENCE IN SPECIAL STUDIES

The Graduate School of Arts and Sciences has academic jurisdiction over degrees of Master of Arts in Special Studies and Master of Science in Sp Studies. These degree programs provide a course of study appropriate to t students who wish to emphasize interdisciplinary work. They are offered off and on campus. The programs off campus can only be offered for a gr of students with mutual educational goals. The programs allow a maxim of flexibility; however, they must be developed around identified objects must provide a structured sequence of study toward these goals. Univers representatives will work with interested groups to develop suitable progra The contemplated curriculum must be approved prior to admission to Graduate School. A student interested in interdisciplinary work leading to of these degrees who is not in a group program must register on campus.

For information on Special Studies programs currently available in o campus programs, see "Special Degree Programs," pages 67–68.

ADMISSION

For detailed information see "Admission as a Degree Candidate," pages 16– and "Master's Degree Candidacy," pages 19–21.

REQUIREMENTS FOR THE DEGREES

The program of study consists of 36 semester hours of course work inclu a plurality of courses in the arts and sciences (e.g., economics, natural sciences political science, psychology, sociology, statistics), with not more than one third from any single department. *There are no thesis or tool requirements.* Advanced undergraduate courses (those numbered 101–200) may be included in the program of study upon the approval of the Graduate School and with the provision that students complete additional work for graduate credit.

Each program of study must be approved by the Dean of the Graduate School of Arts and Sciences and the departmental adviser.

RESIDENCE

A minimum of 30 semester hours of graduate work must be completed while registered as a degree candidate in one of the off-campus degree programs.

SCHOLARSHIP

Graduate students are expected to maintain a minimum accumulative grade average of *B* (3.00) in all course work in the program of studies. Individual departments may require a higher average.

In the case of a student who receives a grade of *F* for a course in his program of studies, the Graduate School will require a departmentally approved written statement justifying the student's continuance in the Graduate School and outlining the program to be followed. Continuation is contingent upon the Dean's approval. A course in the program of studies for which an *F* is received cannot be subsequently removed from the program even though another course is taken as a substitute.

MASTER'S COMPREHENSIVE EXAMINATION

Master's degree candidates must pass a Master's Comprehensive Examination administered by the Graduate School of Arts and Sciences on campus on specified dates (see Calendar).

A student who fails to pass the Master's Comprehensive Examination may, in exceptional circumstances, and with the approval of the department and the Dean, repeat the Examination at the next scheduled date. If he fails a second time, no further opportunity to take the Examination is permitted.

WITHDRAWAL

Graduate students who intend to withdraw from the Graduate School of Arts and Sciences should inform the School in writing. The last day for complete withdrawal without academic penalty is at the end of the eighth week of classes.

LEAVE OF ABSENCE

If a student is temporarily unable to continue his program of studies, he may request leave of absence for a specific period of time, not to exceed one calendar year. When the period of leave has expired, it is the student's responsibility to notify the Graduate School at least two months in advance of a given registration period of his intention to reregister. If he fails to reregister, his candidacy will be terminated.

MASTER OF SCIENCE IN ADMINISTRATION

The School of Government and Business Administration has academic jurisdiction over the degree of Master of Science in Administration. This degree program provides a course of study appropriate for those students currently working in government or industry. It is a professional degree, preparing graduates for positions of higher and broader responsibility and generally improving their competence as administrators. Students expecting to continue in a doctoral program should consult the Committee on Doctoral Studies in the School of Government and Business Administration concerning necessary prerequisites. Students will usually find it advantageous to consult with the Committee early in planning their Master's degree programs.

The University cannot guarantee that all courses in this curriculum will be offered at every off-campus center. However, any student who has been admitted to degree candidacy may arrange to complete his curriculum by registering on campus. Campus registration is *limited to the last 12 hours of a degree program.*

OBJECTIVES OF THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

The principal objective of the School of Government and Business Administration is to prepare its graduates for positions in the management of complex organizations in both business and government. The degree programs are designed to prepare students both for *entrance* into business and government and for *advancement* to high-level management positions.

Programs in the School include examination of administrative principles and quantitative approaches to decision-making common to both business and government. These programs stress the points at which major policy decisions of either business or government must give consideration to related policy decisions of the other. Emphasis is placed on the fact that management education is not limited to organizational techniques but is, in the broadest sense, education for management responsibility.

It is the policy of the School to emphasize a broad fundamental education as the best preparation for positions carrying management or administrative responsibility.

The degree of Master of Science in Administration develops the elements common to all management positions regardless of the nature of the operation. This degree program is based on the study of the principles of management, human relations, and problem-solving plus an area of specialization.

In order to provide students with a common body of knowledge of business or governmental administration, programs include the equivalent of at least one year of work comprising the following areas:

1. In the case of business enterprise, a background of the concepts, processes, and institutions in marketing and distribution, production, and financial functions; in the case of governmental administration, a background of concepts, processes, and institutions of planning, programming, budgeting, personnel practices, and policy formulation in government.
2. A background of the economic and legal environment of business and government enterprise, along with consideration of the social and political influences on business.
3. A basic understanding of the concepts and methods of accounting, budgeting, quantitative methods, and information systems.
4. A study of organization theory, interpersonal relationships, control and motivation systems, and communications.
5. A study of administrative processes under conditions of uncertainty, including the integration of analysis and policy determination at the overall management level.

ADMISSION

For detailed information see "Admission as a Degree Candidate," pages 16–17, and "Master's Degree Candidacy," pages 19–21.

REQUIREMENTS FOR THE DEGREE

RESIDENCE

A minimum of 30 semester hours of graduate work must be completed while registered as a degree candidate in this off-campus program.

The thesis and thesis seminar (6 semester hours) may be included in the 30

hours of course work taken in residence. A graduate student who transfers from another division of the University is required to have a minimum of 12 hours of course work as a degree candidate in this off-campus program.

SCHOLARSHIP

An average of *B* or better is required for the Master's degree. The grade of *C* is not considered as failing but must be counter-balanced by a grade of *A* in a graduate course of equal status. A student who receives a grade of *F* in a course required in his program of study must repeat the course. A student whose scholarship is unsatisfactory may be suspended.

THESIS

With the approval of the adviser, a thesis may be substituted for 6 semester hours of course work.

The thesis subject and the thesis in its final form must be approved by the director of the thesis and the faculty adviser and presented to the Dean no later than the date announced in the calendar. Printed copies of detailed regulations regarding the form and reproduction of the thesis are available at the Office of Counseling and Information Services, College of General Studies.

Payment of tuition for the thesis entitles the candidate, during the two semesters he registers for thesis (299–300), to the advice and direction of the member of the faculty under whom the thesis is to be written. In case a thesis is unfinished, an additional successive academic year is granted without further tuition payment. The student must, however, maintain continuous registration during this period. If the preparation of the thesis extends more than three semesters beyond the date the student registers for thesis 300, he must register for the entire 6 hours of thesis again and pay tuition as for a repeated course.

COURSE SUBSTITUTION

It is the responsibility of the student to get written approval from the faculty adviser prior to registration for any course substitution. Forms for requesting substitution are available at the Office of Counseling and Information Services, College of General Studies.

MASTER'S COMPREHENSIVE EXAMINATION

The Master's candidate is required to pass a written Master's Comprehensive Examination. Before applying for the Examination, the student must have completed or be registered for all of the courses in his program, and he must have maintained a 3.00 (*B*) average. *After applying for the Examination, a candidate may withdraw only by notice in writing to the appropriate department chairman. Failure to take the Examination without an official withdrawal constitutes a failure for the Examination.* In writing the Examination, the student is expected to correlate what he has learned in his course work and his reading in the literature of the field. The Examinations are conducted at the University in December for students graduating in February, in April for students graduating in May, and in July for students graduating in September.

A candidate who fails the Examination may, in exceptional circumstances and with specific approval of his advisers, repeat the Examination, but only after the lapse of one semester and the undertaking of additional preparation as

prescribed. *If he fails a second time, no further opportunity to take the Examination will be permitted.*

REQUIRED COURSES

		Semester Hours
B Ad 202:	Relations of Government to Business	
*†Econ 220:	Survey of Principles and Issues in Economics	
Mgt 201:	Advanced Administrative Management	
‡Mgt 204:	Quantitative Factors in Administration	
Mgt 207:	Human Behavior in Organizations	
Mgt 218:	Survey of Data Processing	
		15
Area of Concentration:		12–15
†Elective:	To be selected with the approval of the adviser	0–3
	Total	30

Areas of Concentration

I. AUTOMATIC DATA PROCESSING

Faculty Adviser: John F. McCarthy, Jr., Associate Professor of Business Administration; Government 409, Telephone 676-7089.

This area of concentration provides a broad understanding of the principles of manual, mechanical, and electronic data processing, including computer programming concepts, methods, and languages; an appreciation of the capabilities and the limitations of data processing equipment; a knowledge of the phases of management information systems development; and an understanding of management's role in data processing. It provides an appreciation of the role of data processing as a tool of management.

		Semester Hours
Mgt 219:	Digital Computer Programming Concepts	
Mgt 220:	Comparative Digital Computer Systems and Their Management	
Mgt 221:	Management Information Systems Development and Application	
Mgt 223:	Management of a Data Processing Organization	
	Total	12

II. BUSINESS FINANCIAL MANAGEMENT§

Faculty Adviser: Rodney Eldridge, Associate Professor of International Finance; Government 405, Telephone 676-6892.

This area of concentration provides a background in business budgeting, con-

* Not required in Business Management area of concentration.
† Econ 217 and 218 may be used to satisfy the Econ 220 requirement and 3 semester hours of elective.
‡ Mgt 204 is waived for students electing Business Financial Management, Management Science-Operations Research, or Systems Management as an area of concentration.
§ Mgt 204 *Quantitative Factors in Administration* is waived in this area of concentration.

ollership, treasury, long-range planning, reporting, and financial management rocesses. Courses are designed to emphasize the planning, analysis, implementation, and controls necessary for making effective financial decisions.

		Semester Hours
Acct 215:	Survey of Managerial Accounting	3
B Ad 231:	Financial Decision-making	3
B Ad 232:	Capital Resource Management	3
B Ad 233:	International Business Finance	3
B Ad 237:	Investment Analysis	3
*Mgt 225:	Introduction to Managerial Statistics	3
	Total	18

I. BUSINESS MANAGEMENT

aculty Adviser: To be announced.

his area of concentration, with its prerequisites, provides the essentials of busiess administration with emphasis upon managing the finance, production, marting, and accounting functions of a business firm. These functions are integrated in a final course using actual business cases.

Nine semester hours in Mathematics; 6 semester hours in Economics (not including Econ 220); and 3 semester hours each in Accounting, Business Administration, and Statistics are prerequisite to the Business Management area of oncentration.

		Semester Hours
Acct 215:	Survey of Managerial Accounting	3
B Ad 225:	Seminar: Manufacturing Production	3
B Ad 231:	Financial Decision-making	3
B Ad 241:	Marketing Management	3
B Ad 297:	Case Studies in Business Administration	3
	Total	15

. GOVERNMENTAL ADMINISTRATION

aculty Adviser: Daniel R. Cloutier, Professor of Public Administration; Government 02, Telephone 676-6295.

his area of concentration emphasizes policy formulation and administration government. It provides the broad dimensions of public administration for ose preparing for managerial responsibility in the public service.

		Semester Hours
P Ad 213:	Administration in Government	3
P Ad 231:	Public Personnel Administration	3
P Ad 251:	Governmental Budgeting	3
P Ad 252:	Problems in Planning, Programming, and Budgeting	3
P Ad 260:	Seminar: Policy Formulation and Administration	3
	Total	15

*Mgt 263 *Mathematics for Management* or the equivalent is prerequisite for this course.

V. INDUSTRIAL PERSONNEL MANAGEMENT

Faculty Adviser: Joe L. Jessup, Professor of Business Administration; Governmen 400, Telephone 676-6068.

This area of concentration provides a basic academic and professional founda tion, equipping the student for administrative responsibility in industrial per sonnel management. The courses cover the fields of personnel management, industrial relations, unionism, collective bargaining, labor relations, and man power development and utilization.

		Semester Hours
B Ad 208:	Personnel Management and Industrial Relations	3
B Ad 209:	Seminar: Personnel Management	3
B Ad 212:	Unionism and Collective Bargaining	3
B Ad 213:	Current Issues in Unionism, Collective Bargaining, and Labor Relations	3
P Ad 233:	Seminar: Manpower Development and Utilization	3
	Total	15

VI. INTERNATIONAL COMMERCE

Faculty Adviser: Geza P. Lauter, Associate Professor of Business Administration. Government 404, Telephone 676-7374.

This area of concentration prepares students for careers in firms operating on a multinational basis or about to enter the international field; for careers in the federal government and in international agencies concerned with business, in dustry, and finance abroad; and for the commerce option of the Foreign Ser ice Officer Examination.

		Semester Hours
B Ad 233:	International Business Finance	3
B Ad 248:	International Marketing	3
B Ad 255:	International Trade	3
B Ad 256:	Seminar: International Trade	3
B Ad 257:	Operation of the Multinational Firm	3
	Total	15

VII. MANAGEMENT ENGINEERING

Faculty Adviser: Jack W. Waldrip, Assistant Professor of Management; Building Y, Room 21, 2131 G Street, N.W.; Telephone 676-7139.

This area of concentration provides a background for industrial management. Courses cover organization and functioning of industrial firms, and the man agement practice and problems of such firms.

		Semester Hours
B Ad 225:	Seminar: Manufacturing Production	3
B Ad 280:	Procurement and Contracting	3
B Ad 297:	Case Studies in Business Administration	3
Mgt 224:	Theory and Management of Systems	3
Mgt 230:	Administration of Research and Development	3
	Total	15

VIII. MANAGEMENT SCIENCE—OPERATIONS RESEARCH*

Faculty Adviser: Robert L. Holland, Associate Professor of Management Science; Government 204, Telephone 676-6380.

This area of concentration develops an understanding of quantitative approaches to problems of managerial control and decision-making. While the program will develop a competent background in basic mathematical theory associated with the various techniques, it is oriented towards applications of the techniques rather than their theoretical mathematical content.

		Semester Hours
†Mgt 225:	Introduction to Managerial Statistics	3
Mgt 226:	Managerial Statistics	3
Mgt 227:	Mathematical Programming: Techniques and Applications	3
Mgt 229:	Seminar: Management Science and Operations Research	3
‡Other Courses:	To be selected from the following as approved by the adviser	6–9
B Ad 225:	Seminar: Manufacturing Production	
Mgt 219:	Digital Computer Programming Concepts	
Mgt 220:	Comparative Digital Computer Systems and Their Management	
Mgt 224:	Theory and Management of Systems	
Mgt 228:	Systems Analysis by Simulation	
	Total	18–21

K. MANAGERIAL ACCOUNTING

Faculty Adviser: Anthony J. Mastro, Associate Professor Accounting; Government 202. Telephone 676-6055.

This area of concentration provides a knowledge of interrelated systems of accounting in planning and control for management. Emphasis is on the requirements of management for accounting information with concern for general and corporate accounting principles to the extent related to the managerial accounting functions.

Acct 115 *Survey of Financial Accounting* or the equivalent is prerequisite to the Managerial Accounting area of concentration.

		Semester Hours
§Acct 215:	Survey of Managerial Accounting	3
Acct 262:	Business Income Taxation	3
Acct 276:	Management Planning and Control	3
Acct 295:	Seminar in Accounting	3
Mgt 219:	Digital Computer Programming Concepts	3
	Total	15

* 204 *Quantitative Factors in Administration* is waived in this area of concentration.
† 203 *Mathematics for Management* or the equivalent is prerequisite for this course.
‡ Students substitute Econ 217–18 for Econ 220 and 3 semester hours of elective in the Related Courses (see page 58), they will elect only 6 hours of Other Courses.
§ Acct 215 or an equivalent course has been taken prior to entrance into this program, students substitute Acct 275 or 282.

X. PROCUREMENT AND CONTRACTING

Faculty Adviser: Stanley N. Sherman, Assistant Professor of Business Administration; Government 312, Telephone 676-7462.

This area of concentration provides a basic academic and professional foundation, equipping the student for administrative responsibility in procurement and contracting. The courses cover industrial purchasing, procurement activities of the federal government, and contracting activities of vendors to the federal government.

		Semester Hours
B Ad 279:	Purchasing and Materials Management	3
B Ad 280:	Procurement and Contracting	3
B Ad 282:	Government Contract Administration	3
B Ad 283:	Pricing and Negotiation	3
B Ad 285:	Systems Procurement and Project Management	3
	Total	15

XI. PUBLIC FINANCIAL MANAGEMENT AND BUDGETING

Faculty Adviser: Stephen R. Chitwood, Associate Professor of Public Administration; Government 310, Telephone 676-6064.

This area of concentration provides a broad foundation for work in governmental planning, programming, budgeting; and for controllership and related financial management activities. Its main stress is on financial processes and decision-making in the public service.

		Semester Hours
Acct 215:	Survey of Managerial Accounting	3
P Ad 213:	Administration in Government	3
P Ad 251:	Governmental Budgeting	3
P Ad 252:	Problems in Planning, Programming, and Budgeting	3
	Total	12

XII. PUBLIC PERSONNEL MANAGEMENT

Faculty Adviser: Waldo Sommers, Professor of Public Administration; Government 1A, Telephone 676-6792.

This area of concentration provides a basic academic and professional foundation, equipping the student for administrative responsibility in public personnel management. The courses cover the federal administrative organization and process; principles, functions, and problems of personnel administration in the public service; unionism and collective bargaining; and manpower development and utilization.

		Semester Hours
B Ad 212:	Unionism and Collective Bargaining	3
P Ad 213:	Administration in Government	3
P Ad 231:	Public Personnel Administration	3
P Ad 232:	Problems in Public Personnel Management	3
P Ad 233:	Seminar: Manpower Development and Utilization	3
	Total	15

II. RESEARCH AND DEVELOPMENT MANAGEMENT

culty Adviser: Daniel D. Roman, Professor of Management Science; Government 0). Telephone 676-6298.

his area of concentration provides a basic academic and professional founda-on, equipping the student for responsibility in research and development man-gement. The courses cover technological change and manpower, public policy ward science and technology, government contract administration, and the dministration of research and development.

		Semester Hours
B Ad 282:	Government Contract Administration	3
Mgt 230:	Administration of Research and Development	3
P Ad 235:	Technological Change and Manpower	3
P Ad 262:	Seminar: Science, Technology, and Public Policy	3
Other Courses:	To be selected from the following as approved by the adviser	6
B Ad 225:	Seminar: Manufacturing Production	
B Ad 285:	Systems Procurement and Project Management	
Mgt 203:	Mathematics for Management	
Mgt 225:	Introduction to Managerial Statistics	
Mgt 226:	Managerial Statistics	
	Total	18

IV. SYSTEMS MANAGEMENT*

aculty Adviser: Marvin M. Wofsey, Professor of Management; Building Y, Room 2131 G Street, N.W.; Telephone 676-7183.

his area of concentration provides a basic academic and professional founda-on, equipping the student for administrative responsibility in computer-based ystems. The courses cover computers, data processing, operations research, nd the theory and management of systems.

		Semester Hours
†Mgt 203:	Mathematics for Management	3
Mgt 220:	Comparative Digital Computer Systems and Their Management	3
Mgt 223:	Management of a Data Processing Organization	3
Mgt 224:	Theory and Management of Systems	3
Mgt 225:	Introduction to Managerial Statistics	3
	Total	15

LECTIVES

Unless a student elects to write a thesis, he may select electives appropriate to is program from graduate courses offered by the School of Government and usiness Administration. To choose electives from other related departmental fferings in this University, the student must obtain the written approval of the aculty adviser. A form for this purpose may be obtained from the Office of ounseling and Information Services, College of General Studies.

* Mgt 204 *Quantitative Factors in Administration* is waived in this area of concentration.
† Students who are proficient in calculus should substitute an appropriate elective course which has been approved by the adviser.

MASTER OF SCIENCE*

The School of Engineering and Applied Science in cooperation with the tional Aeronautics and Space Administration's Langley Research Center, Ha ton, Virginia, has a graduate engineering program at NASA-Langley. NA Langley's extensive scientific and engineering facilities and equipment are av able to students in this program.

The programs at NASA-Langley lead to the degrees of Master of Science a (by special permission of the appropriate department chairman) Doctor Science in the fields of acoustics, aerospace engineering (including options aeronautics and astronautics), applied mechanics, computer-aided structu design, computer science, electrical engineering, flight sciences, materials e gineering, and mechanical engineering. These programs are open to qualifi NASA employees and area residents. With the approval of the instructo courses may be taken in nondegree status.

The School of Engineering and Applied Science in cooperation with t Naval Ship Research and Development Center, Annapolis, Maryland, has graduate engineering program leading to the degree of Master of Science fields of electrical engineering and in ocean engineering. The programs a open to qualified NSRDC employees and area residents. Classroom facilitie at the U.S. Naval Academy are available for this program.

The School of Engineering and Applied Science has academic jurisdictio over these degree programs which are administered by the College of Genera Studies.

ADMISSION

For detailed information see "Admission as a Degree Candidate," pages 16–17, and "Master's Degree Candidacy," pages 19–21.

REQUIREMENTS FOR THE DEGREE

The minimum program consists of 24 semester hours of approved graduate courses and a Master's thesis (equivalent to 6 semester hours). With the approval of the Department, the student may elect an optional program without a thesis which consists of a minimum of 33 semester hours of approved graduate courses. All Master's candidates are required to pass a Master's Comprehensive Examination. Students whose undergraduate study does not include necessary prerequisites may be required to take more than the minimum semester hours required.

Upon admission the student is assigned an adviser. Programs of study are determined by any prerequisites established and the requirements of the department in which the student wishes to study. The program of studies in preparation for the Master's Comprehensive Examination must be approved by the student's adviser and the appropriate department chairman.

SCHOLARSHIP

For Master's work, a minimum of 24 semester hours (for those who receive credit for a thesis) or 33 semester hours (for those who follow the optional program without a thesis) of graduate course work with the grade of *B* or higher is

* For course descriptions, see the *School of Engineering and Applied Science* catalogue.

required for graduation. Students who receive two grades of *F*, or three grades below *B*, are barred from further enrollment in graduate courses and, ordinarily, will not be readmitted to graduate study. Students who receive the grade of *C* in one or two courses are required to take additional course work to make up the minimum semester hours of work with grades of *B*.

RESIDENCE

In general, a minimum of one year of full-time study, or the equivalent in part-time study, must be completed in the School of Engineering and Applied Science.

MASTER'S THESIS

The degree candidate must submit an acceptable thesis to demonstrate his ability to make independent use of the knowledge and discipline of thought acquired and developed by graduate study, to furnish objective evidence of constructive power in a given field, and to demonstrate that he can communicate the results of his work in writing. Work of a suitable character for which the student has professional responsibility may be considered, whether done on or off campus, provided no significant amount of work is completed without faculty supervision.

As a part of registration for the thesis course 299, the candidate must submit to the appropriate department chairman (on the form obtainable at the School office) his thesis area, approved by his faculty adviser. He must submit his thesis title to the Dean, on the form available in the School office, at the beginning of the semester in which he expects to graduate. Registration in thesis 299–300 entitles the student, during such registration, to the advice of the member of the faculty under whom the thesis is to be written. He may consult his adviser, but the thesis is the exclusive responsibility of the student.

The thesis in final form must be submitted to the appropriate department chairman by the date stated in the calendar for the semester in which the candidate enrolls in thesis 300. In case a thesis is unfinished on the date specified, the student will be granted an additional semester and must pay the "Continuous Registration" fee (see page 24) unless he is registered for course work. If the preparation of the thesis extends beyond the three semesters, approval for an extension of time will be required and the student must reregister for thesis 300 and pay tuition as for a repeated course.

A thesis may be submitted in final form one time. The acceptability of the thesis is determined exclusively by the Master's Comprehensive Examination Committee. If the thesis is unacceptable, the student's graduate status is terminated.

Printed copies of detailed regulations regarding the form and reproduction of the thesis are available in the Office of the School. Accepted theses, with accompanying drawings, become the property of the University and are deposited in the University Library, where the duplicate copies are bound and made available for circulation.

OPTIONAL MASTER'S PROGRAM WITHOUT A THESIS

With the approval of the Department, the student may elect an optional pro-

gram without a thesis which consists of a minimum of 33 semester hou approved graduate courses.

MASTER'S COMPREHENSIVE EXAMINATION

After completing his prescribed program, the candidate must pass a Ma Comprehensive Examination, to demonstrate substantial understanding of ciples and method and their use in the area of his interest. This Examina may be written, oral, or both. A graduate student who fails any portion o Master's Comprehensive Examination on his first attempt may be examined more time if approval is given by the appropriate Examining Committee. the event of failure to complete the Examination satisfactorily, the stude graduate status terminates.

TIME TO COMPLETE MASTER'S DEGREE REQUIREMENTS

A full-time Master's candidate is allowed a maximum of three calendar ye to complete all degree requirements, from the date of his first graduate-stud status registration in prerequisite or graduate courses. A part-time Maste candidate is allowed a maximum of five calendar years. The time limit does include any period of registration as an unclassified student before admissi to graduate student status, nor does it encompass any specified period spent approved leave of absence. Readmission is required upon expiration of leave absence under the conditions and requirements then prevailing.

Students who do not complete degree requirements within the allowed tim have their graduate status terminated. They may be readmitted to graduat status under conditions specified by the department chairman and approved the Dean.

MASTER OF ENGINEERING ADMINISTRATION

The School of Engineering and Applied Science in cooperation with the Naval Ship Research and Development Center, Annapolis, Maryland, has a gradu uate engineering program leading to the degree of Master of Engineering Ad ministration. The program is open to qualified NSRDC employees and area residents. Classroom facilities at the U.S. Naval Academy are available for this program.

The School of Engineering and Applied Science has academic jurisdiction over this degree program which is administered by the College of General Studies.

ADMISSION

For detailed information see "Admission as a Degree Candidate," pages 16–17 and "Master's Degree Candidacy," pages 19–21.

REQUIREMENTS FOR THE DEGREE

The requirements for the degree of Master of Engineering Administration are the same as those listed under the degree of Master of Science (see pages 64–66).

SPECIAL DEGREE PROGRAMS

MASTER OF ARTS IN SPECIAL STUDIES (Legislative Affairs)

A new program of study leading to the degree of Master of Arts in Special Studies with a concentration in Legislative Affairs is offered off campus by the Graduate School of Arts and Sciences. The program, focusing on the Congress of the United States, includes 12 semester hours in legislative theory and research, 6 to 12 hours in the processes of politics, and 6 to 12 hours in public policy analysis. For further information, contact William F.E. Long, Associate Dean of the Graduate School of Arts and Sciences, telephone 676-6210, or Ralph I. DeBelles, Director of District of Columbia Credit Programs, College of General Studies, telephone 676-7016.

MASTER OF SCIENCE IN ADMINISTRATION

In cooperation with the Industrial College of the Armed Forces, Fort McNair, Washington, D.C., a program of study leading to the degree of Master of Science in Administration is offered by the School of Government and Business Administration. The program is open only to current students and faculty of the Industrial College of the Armed Forces. For further information, contact Harry R. Page, Faculty Adviser for the Industrial College of the Armed Forces Program, School of Government and Business Administration, telephone 676-6115.

MASTER OF SCIENCE IN FORENSIC SCIENCE

The degree of Master of Science in Forensic Science, an interdisciplinary program of study for students concerned with the legal and scientific aspects of evidence, is currently being offered on campus by the Graduate School of Arts and Sciences. The degree program may be offered off campus for a group of students with mutual goals.

A Bachelor's degree with a major in mathematics or in the biological, physical, or engineering sciences, or an equivalent degree is required for admission to the Master's degree program.

The program of study leading to the degree of Master of Science in Forensic Science consists of 36 semester hours of approved graduate-level courses with or without a thesis (equivalent to 6 semester hours). The program must include the following: ForS 201, 202, 224, 225 or 226, 227 or 228; Mgt 218; and 6 semester hours of graduate-level courses selected, with the approval of the advisers, from the biological and physical sciences. The remaining semester hours of course work must be selected from approved courses in the areas of science, law, and management science; however, the student may elect courses from only two of the three areas. There is no tool requirement. All students are required to pass a Master's Comprehensive Examination.

For the general requirements for Master's degree study in the Graduate School of Arts and Sciences and for a description of elective courses suggested in this Master's degree program, see the *Undergraduate and Graduate Catalogue*. For further information, contact William F.E. Long, Associate Dean of the Graduate School of Arts and Sciences, telephone 676-6210, or Earl Ross, Director of Plans and Programs, College of General Studies, telephone 676-7320.

MASTER OF SCIENCE IN INTERNATIONAL AFFAIRS

In cooperation with the National War College, Fort McNair, Washington, D.C., and the Naval War College, Newport, R.I., a program of study leading to the degree of Master of Science in International Affairs is offered by the School of Public and International Affairs. This program is open only to students and faculty of the National and Naval War Colleges. For further information, contact R.C. Burns, Coordinator of the War College Programs, School of Public and International Affairs, telephone 676-7050.

MASTER OF SCIENCE IN SPECIAL STUDIES (Oral Biology)

In cooperation with the Naval Dental School of the National Naval Medical Center, Bethesda, Md., a program of study leading to the degree of Master of Science in Special Studies with a concentration in Oral Biology is offered by the Graduate School of Arts and Sciences. The program is open to dental officers serving on active duty with the U.S. Armed Forces or with other federal agencies. For further information, contact William F.E. Long, Associate Dean of the Graduate School of Arts and Sciences, telephone 676-6210, or Edward B. Wright, Associate Director of Maryland Credit Programs, College of General Studies, 676-7024.

MASTER OF SCIENCE IN SPECIAL STUDIES (Forensic Science)

A program of study leading to the degree of Master of Science in Special Studies with a concentration in Forensic Science can be offered off campus by the Graduate School of Arts and Sciences for a group of students with mutual goals in the study of scientific aspects of legal evidence. For further information, contact the Office of the Dean of the Graduate School of Arts and Sciences, telephone 676-6210, or Earl Ross, Director of Plans and Programs, College of General Studies, telephone 676-7320.

MASTER OF SCIENCE IN SPECIAL STUDIES (Telecommunication Operations)

A new program of study leading to the degree of Master of Science in Special Studies with a concentration in Telecommunication Operations is offered off campus by the Graduate School of Arts and Sciences. This program is designed to introduce personnel with technical backgrounds in communications to related work in the field of business administration, economics, management science, political science, sociology, and statistics. For further information, contact William F.E. Long, Associate Dean of the Graduate School of Arts and Sciences, telephone 676-6210, or Ralph I. DeBelles, Director of District of Columbia Credit Programs, College of General Studies, telephone 676-7016.

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OFF-CAMPUS LOCATIONS OF THE COLLEGE OF GENERAL STUDIES

DISTRICT OF COLUMBIA

Bolling Air Force Base, Washington, D.C. 20332

Education Director: Edward Corbin
Office: Room 205, Building P-20
Telephone: 574-5348
Representative for the University: Stephen Crandall
Telephone: 676-7067

Open to military and civilian personnel of the Air Force and to others by permission

Federal After-hours Program

Representative for the University: Robert W. Stewart, Jr.
Telephone: 676-7018

Open to employees of federal agencies, military, and industry, and to others by permission

The following agencies participate in the Federal After-hours Program:

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Director: James J. Doherty, Training and Career Development
Office: 2100 K Street, N.W.
Telephone: 964-8000

BUREAU OF DOMESTIC AND INTERNATIONAL BUSINESS, WASHINGTON, D.C. 20230

Education Director: David Sullivan, Chief, Employee Development Branch
Office: Room 1521, Commerce Department Building, 14th Street and Constitution Avenue, N.W.
Telephone: 967-7075 or 967-7076

BUREAU OF NARCOTICS AND DANGEROUS DRUGS, WASHINGTON, D.C. 20573

Education Director: N.E. Bentson, Personnel Officer
Office: Room 605, 1405 Eye Street, N.W.
Telephone: 382-4231

CIVIL SERVICE COMMISSION, WASHINGTON, D.C. 20415

Greer Person, Director of Personnel
For information contact Employee Development Officer, Personnel Division
Office: Room 1679, 1900 E Street, N.W.
Telephone: 632-5400

COAST GUARD, WASHINGTON, D.C. 20591

Chief, Training Section, Headquarters Civilian Personnel Branch (CAS-5/81): W.I. Barry
Office: Room 8114A, Nassif Building, 400 7th Street, S.W.
Telephone: 426-2342

DEPARTMENT OF JUSTICE, WASHINGTON, D.C. 20530

Education Director: Daniel Keenan, Chief, Career Development Section
Office: Room 1132, 10th Street and Pennsylvania Avenue, N.W.
Telephone: 739-4371

DEPARTMENT OF LABOR, WASHINGTON, D.C. 20210

Chief, Training and Development Group: Joseph Maas
For information contact Mrs. Carole Johnson
Office: Room 6141, 14th Street and Constitution Avenue, N.W.
Telephone: 961-2101

DEPARTMENT OF STATE, WASHINGTON, D.C. 20520

Liaison Officer: Mrs. Barbara Morlet, Registrar and Training Specialist for Extension Studies
Office: Foreign Service Institute, State Annex 3
Telephone: 557-5517 or 557-5518

DEPARTMENT OF THE TREASURY, WASHINGTON, D.C. 20226

BUREAU OF ACCOUNTS

Education Director: Miss Pamela Carlson, Employee Development Specialist
Office: Room 112, Treasury Annex Number 1, Pennsylvania Avenue and Madison Place, N.W.
Telephone: 964-5565

DISTRICT OF COLUMBIA GOVERNMENT, WASHINGTON, D.C. 20001

Education Director: C. Howard Larson, Chief, Training and Career Development
Office: Room 215, 499 Pennsylvania Avenue, N.W.
Telephone: 629-2997

FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C. 20591

Education Director: Mrs. Phyllis Burbank, Employee Development Specialist
Office: Room 509, 800 Independence Avenue, S.W.
Telephone: 426-3320

FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, D.C. 20554

Education Director: Charles A. Orsi
Office: Room 208, 1919 M Street, N.W.
Telephone: 632-6304 or 632-6385

FEDERAL RESERVE SYSTEM, WASHINGTON, D.C. 20551

Education Coordinator: Miss Sudelle Rice, Personnel Technician
Office: 20th Street and Constitution Avenue, N.W.
Telephone: 737-1100, Extension 404

INTERNAL REVENUE SERVICE, WASHINGTON, D.C. 20224

Education Director: D.C. Barry, Chief, National Office Training Branch
Office: Room 1311, 12th Street and Constitution Avenue, N.W.
Telephone: 964-6101

INTERSTATE COMMERCE COMMISSION, WASHINGTON, D.C. 20423

Education Director: Samuel D. Bingman, Jr., Training Officer
Office: Room 1420, 1200 Constitution Avenue, N.W.
Telephone: 737-9765, Extension 7116

NATIONAL SCIENCE FOUNDATION, WASHINGTON, D.C. 20550

Training Officer: Herbert L. Morris
Office: 1800 G Street, N.W.
Telephone: 632-4107

POST OFFICE DEPARTMENT, WASHINGTON, D.C. 20260

Education Directors: Francis J. Mahaney; J.A. Matukonis, Training Division, Bureau of Personnel
Office: Room 205, 6900 Wisconsin Avenue, Chevy Chase, Md.
Telephone: 656-9125

VETERANS ADMINISTRATION, WASHINGTON, D.C. 20420

Education Directors: Raymond L. Butler, Chief, Employee Relations and Training Division; Philip L. Loomis, Assistant Chief, Employee Relations and Training Division
Office: Room 100, Veterans Administration Main Building, Vermont Avenue and H Street, N.W.
Telephone: 389-3101

Forrestal Building, L'Enfant Plaza, Washington, D.C. 20314

Education Director and Chairman of the Department of Defense Education and Training Advisory Council: Philip F. Strauss
Office: Room 3C147, The Pentagon
Telephone: 697-8015 or 697-2823
Program Coordinator: George Merritt
Office: Room BE079, Forrestal Building
Telephone: 693-8484 or 693-8485
Representative for the University: Robert W. Stewart, Jr.
Telephone: 676-7018

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Industrial College of the Armed Forces, Fort McNair, Washington, D.C. 20315

Project Officer: Col. Edward Nacey, USAF
Office: Room 324, Industrial College of the Armed Forces
Telephone: 693-8413

Director for the University: Harry R. Page
Office: Room 302, Hall of Government, 710 21st Street, N.W.
Telephone: 676-6115
Representative for the University: Harvey Snyder
Telephone: 676-7028
Open to students and faculty of the Industrial College of the Armed Forces

Washington Navy Yard, Washington, D.C. 20390

Education Director: Miss Clara Williams, Employee Development Officer
Office: Room 202, Building 172, M and 9th Streets, S.W.
Telephone: 433-3188 or 433-3160
Representative for the University: Stephen Crandall
Telephone: 676-7067
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MARYLAND

Aberdeen/Edgewood, Md.

Aberdeen Area Education Director: John L. Lichy, Chief, Educational Services Division
Office: Building 3146, Army Education Center, Aberdeen Proving Ground, Md. 21005
Telephone: (301) 278-3385
Edgewood Area Education Officer: R.G. Mehr
Office: Building 4475, Edgewood Area, Md. 21010
Telephone: (301) 671-2166
Representative for the University: Michael G. O'Connor
Telephone: (202) 676-7023
Open to everyone by permission of the Commanding Officer of Aberdeen Proving Ground

Andrews Air Force Base, Washington, D.C. 20331

Education Director: John Clark
Office: Room 4, Building 3484
Telephone: 981-6377
Representative for the University: Robert Engle
Telephone: 676-7025
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Army Topographic Command, Corps of Engineers, Washington, D.C. 20315

Education Directors: Gene Hastings, Chief, Training and Development Division; John Rea, Development Specialist; Mrs. Connie Clem, Personnel Specialist
Office: Erskine Hall, 6500 Brooks Lane, N.W.
Telephone: 227-2147
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to employees of the U.S. Army Topographic Command and others by permission, obtained at least one week prior to the first week of classes, from the Training and Development Division, Telephone 227-2147

Edgewood Arsenal, Md. 21010 (see Aberdeen/Edgewood)

Fort George G. Meade, Md. 20755

Education Director: Gustaf Berglund
Office: Building 303, Army Education Center
Telephone: (301) 677-6421
Representative for the University: Michael G. O'Connor
Telephone: (202) 676-7023
Open to everyone by permission of the Commanding Officer of Fort George G. Meade

Frederick Community College, Frederick, Md. 21701

Education Director: Patrick L. Christoff, Assistant Dean of Community Services
Office: Opossumtown Pike
Telephone: (301) 662-0101
Representative for the University: Robert Engle
Telephone: (202) 676-7025
Open to everyone

Hagerstown Junior College, Hagerstown, Md. 21740

Education Director: Frederick F. Otto, Dean of Community Services
Office: 751 Robinwood Drive
Telephone: (301) 731-2800, Extension 36
Representative for the University: Robert Engle
Telephone: (202) 676-7025
Open to everyone

Montgomery College, Rockville, Md. 20850

Education Director: Howard S. Geer, Director of New Programs and Community Services
Office: 51 Mannakee Street
Telephone: 726-6088
Representative for the University: Frank Dulong
Telephone: 676-7029
Open to everyone

National Naval Medical Center, Bethesda, Md. 20014

Education Director: J. Szabados, Head, Training and Educational Services
Office: Room 209B, Building 1
Telephone: 295-0574
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to military and civilian personnel of the Navy, employees of the National Institutes of Health, and to others as space permits

National Oceanic and Atmospheric Administration, Rockville, Md. 20852

Education Director: Paul F. Murphy, Employee Development Officer
Office: Room 323, North Bethesda Office Center, 11820 Rockville Pike
Telephone: 496-8261

Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to all employees of the Department of Commerce and to others by permission

Naval Academy, Annapolis, Md. 21402

Coordinator for the University Programs: William W. Jeffries, Archivist, U.S. Naval Academy
Office: Maury Hall
Telephone: (301) 268-7711, Extension 642
Representative for the University: Michael G. O'Connor
Telephone: (202) 676-7023
Open to everyone by permission of the Superintendent of the U.S. Naval Academy

Naval Air Station, Patuxent River, Md. 20670

Training Director: E. G. Russell, Head, Employee Development Division; Mrs. Wanda Denton, Employee Development Specialist
Office: Naval Building 463, Civilian Personnel Department
Telephone: (301) 863-3734 or 863-3735
Representative for the University: Edward B. Wright
Telephone: (202) 676-7024
Open to military and civilian personnel of the Navy and to others by permission

Naval School of Health Care Administration, Bethesda, Md. 20014

Commanding Officer: Capt. William J. Green, Jr., MSC,USN
Academic Director: LCdr. William Auton, MSC, USN
Office: Room 131, Building 141
Telephone: 295-1314
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to military personnel assigned to duty under instruction at the U.S. Naval School of Health Care Administration

Naval Ship Research and Development Center, Annapolis, Md. 21402

Education Director: Price Mosher
Office: Building 42, Training Center
Telephone: (301) 268-7711, Extension 8210
Representative for the University: Michael G. O'Connor
Telephone: (202) 676-7023
Open to everyone by permission of the Officer in charge of the Center

Naval Ship Research and Development Center, Carderock, Md. 20007

Education Director: Mack A. Curtis, Head, Training Division
Office: Room 113A, Building 8
Telephone: 227-1204 or 227-1169
Representative for the University: Edward B. Wright
Telephone: 676-7024
Open to military personnel and civilian employees of the Naval Ship Research and Development Center and to others by permission

Naval Ships Engineering Command (see Prince Georges Center Building)

Parklawn Building, Rockville, Md. 20852

Education Director: C. M. Hull
Office: Room 18A03, 5600 Fishers Lane
Telephone: 443-1965
Representative for the University: Frank Dulong
Telephone: 676-7029
Open to employees of the Department of Health, Education, and Welfare and others by permission

Prince Georges Center Building (Naval Ships Engineering Command), Hyattsville, Md. 20788

Education Director: Frank Sharkey, Employee Development Specialist
Office: Room 118E, Civilian Personnel Office, 3700 East-West Highway
Telephone: 436-1104
Representative for the University: Robert Engle
Telephone: 676-7025
Open to everyone

Social Security Administration, Baltimore, Md. 21235

Education Director: Eric Levi
Office: Room 4-L-11, Annex Building, Division of Training and Career Development, 6401 Security Boulevard
Telephone: (301) 594-4523, 594-4524, 594-4520
Representative for the University: Frank Dulong
Telephone: (202) 676-7029
Open to employees of the Social Security Administration and to others by permission

VIRGINIA

Arlington Annex (Bureau of Naval Personnel), Arlington, Va. 20373

Education Director and Chairman of the Department of Defense Education and Training Advisory Council: Philip F. Strauss
Office: Room 3C147, The Pentagon
Telephone: 697-8015 or 697-2823
Program Coordinator: John K. Wilkerson, Head, Training and Incentive Awards Section
Office: Room 1706, Arlington Annex
Telephone: 694-1269
Representative for the University: William C. Robinson
Telephone: 676-7064
Open only to active and retired military personnel and all federal employees

Building T-7, National Airport, Gravelly Point, Washington, D.C. 20315

Education Director and Chairman of the Department of Defense Education and Training Advisory Council: Philip F. Strauss
Office: Room 3C147, The Pentagon
Telephone: 697-8015 or 697-2823

ARMY MATERIEL COMMAND

Program Coordinator: Mrs. Lois Tucker
Office: Room 2507, Building T-7
Telephone: 697-9279
Employee Development Officer: Reading Black
Office: Room 1527, Building T-7
Telephone: 697-0341
Representative for the University: William C. Robinson
Telephone: 676-7064
Open to active and retired military personnel and all federal employees

Bureau of Naval Personnel (See Arlington Annex)

CAPSO-Navy, Arlington, Va. 22203

Education Director: Donald E. Marquart; Miss Kathleen V. Sullivan, After-hours Coordinator
Office: Room 1111, Ballston Towers No. 2, 801 North Randolph Street
Telephone: 692-4476 or 692-4477 or 692-4478 or 692-4479
Representative for the University: W. Grant Boyer
Telephone: 676-7026
Open to military and civilian personnel of the Department of Defense, and to others by permission

Commonwealth Building, 1320 Wilson Boulevard, Rosslyn, Arlington, Va. 22209

Education Director and Chairman of the Department of Defense Education and Training Advisory Council: Philip F. Strauss
Office: Room 3C147, The Pentagon
Telephone: 697-8015 or 697-2823
Program Coordinator: Miss Anna M. Brown
Office: Room 905, Commonwealth Building
Telephone: 694-5758
Representative for the University: W. Grant Boyer
Telephone: 676-7026
Open to active duty military personnel and Department of Defense civilians, and to retired military personnel and other federal employees on a space-available basis

Defense Supply Agency, Cameron Station, Alexandria, Va. 22314

Education Director: Philip C. Strang, Chief, Employee Development Branch
Office: Room 8A111
Telephone: 274-7493
Representative for the University: John W. Gaffney
Telephone: 676-7063
Open to military and civilian personnel of the Department of Defense and to others by permission

Fort Belvoir, Va. 22060

Education Director: Eric Eber
Office: Building T-1483
Telephone: 664-3154 or 664-4546

Representative for the University: John W. Gaffney
Telephone: 676-7063
Open to military and civilian personnel of the Army and to others by permission

Fort Myer, Va. 22211

Education Director: Mrs. Elizabeth J. McGowan
Office: Building 604, South Area, Post Education Center
Telephone: 697-0607
Representative for the University: W. Grant Boyer
Telephone: 676-7026
Open to military and civilian personnel of the Army and to others by permission

Hoffman Building, 2461 Eisenhower Avenue, Alexandria, Va. 22314

Education Director and Chairman of the Department of Defense Education and Training Advisory Council: Philip F. Strauss
Office: Room 3C147, The Pentagon
Telephone: 697-8015 or 697-2823
Building Administrator: John M. Johnson
Office: Room 156, Hoffman Building
Telephone: 325-0150
Representative for the University: John W. Gaffney
Telephone: 676-7063
Open to active duty and retired military personnel and all federal employees

IBM Corporation, Components Division, 439 South Grant Avenue, Manassas, Va. 22110

Manager, Education Department: Thomas Henning
Telephone: (703) 367-3450
Representative for the University: Herbert K. Berthold
Telephone: (202) 676-7014

Langley Senior High School, McLean, Va. 22101

Richard W. Graves, Director, Student Activities
Telephone: 356-1960
Representative for the University: Herbert K. Berthold
Telephone: 676-7014
Open to everyone

Melpar Division of E-Systems, Inc., Falls Church, Va. 22046

Education Director: Anthony B. DePasquale, Personnel Relations Manager
Office: 7700 Arlington Boulevard
Telephone: 560-5000, Extension 2450

USA COMPUTER SYSTEMS COMMAND

Donald Anderson, Chief, Technical Services and Training Division
Office: Melpar Annex
Telephone: 573-8274
Representative for the University: Herbert K. Berthold
Telephone: 676-7014
Open to employees of Melpar and others on a space-available basis

Nassif Building, 5611 Columbia Pike, Falls Church, Va. 22041

Education Director and Chairman of the Department of Defense Education and Training Advisory Council: Philip F. Strauss
Office: Room 3C147, The Pentagon
Telephone: 697-8015 or 697-2823

MILITARY TRAFFIC MANAGEMENT AND TERMINAL SERVICE

Program Coordinator: Miss Marie Brasovan
Office: Room 734, Nassif Building
Telephone: 756-1088

Representative for the University: John W. Gaffney
Telephone: 676-7063
Open to active duty and retired military personnel and all federal employees

Osbourn Senior High School, Manassas, Va. 22110

James W. Bailey, Principal
Office: 200 Tudor Lane
Telephone: (703) 368-9276
Representative for the University: Herbert K. Berthold
Telephone: (202) 676-7014
Open to everyone

The Pentagon, Washington, D.C. 20310

Director of the Pentagon Education Center, Chairman of the Armed Forces Education and Training Advisory Council, and Education Officer for the U.S. Army: Philip F. Strauss
Assistant to the Director: George L. Bowman
Office: Room 3C147
Telephone: 697-2823 or 697-6805 or 697-8015

U.S. AIR FORCE

Education Officer: Edwin Corbin
Office: Room 5E410
Telephone: 697-1863 or 697-7074

Representative for the University: William C. Robinson, Pentagon Desk, Reception Center on the Concourse
Pentagon Telephone: 697-3141
University Telephone: 676-7064
Open only to active and retired military personnel and all federal employees

Reston, Va. 22070

HUNTERS WOODS ELEMENTARY SCHOOL

O. Stuart Chaplain, Jr., Principal
Office: 2401 Colts Neck Road
Telephone: 437-6030

LAKE ANNE ELEMENTARY SCHOOL

Mrs. Emilie McDaniel, Education Secretary
Office: 11510 North Shore Drive
Telephone: 437-3628

REDEEMER UNITED METHODIST CHURCH

The Rev. J. Robert Regan, Jr.
Office: 11508 North Shore Drive
Telephone: 471-5295

Representative for the University: Herbert K. Berthold
Telephone: 676-7014

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Stonewall Jackson Senior High School, Manassas, Va. 22110

Charles Wildman, Principal
Office: 205 Lomond Drive
Telephone: (703) 368-9156
Representative for the University: Herbert K. Berthold
Telephone: (202) 676-7014

Open to everyone

U.S. Marine Corps Base, Quantico, Va. 22134

Education Officer: Major Richard H. Lang, USMC
Office: Education Office, Building 2008
Telephone: (703) 640-2826
Representative for the University: John W. Gaffney
Telephone: (202) 676-7063

Open to military personnel and their dependents and civilian personnel attached to the Marine Corps Base. Others may be admitted by permission.

Vint Hill Farms Station, Warrenton, Va. 22186

Education Director: Eric Eber (Fort Belvoir)
Telephone: (703) 664-3154
Station Education Office
Telephone: (703) 347-6602
Representative for the University: Herbert K. Berthold
Telephone: (202) 676-7014

Open to everyone

OFF-CAMPUS LOCATIONS OF EDUCATION COURSES FOR TEACHERS

DISTRICT OF COLUMBIA PUBLIC SCHOOLS

Representative for the University: Douglas Nelson
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Representative for the University: Douglas Nelson
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Baltimore City Public Schools, Baltimore, Md. 21218

Co-directors of Personnel: Marvin C. Davis, Kenneth Horvath
Office: 3 East 25th Street
Telephone: (301) 467-4000, Extension 451
Representative for the University: Frank Dulong
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Representative for the University: Frank Dulong
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Kent County Public Schools, Chestertown, Md. 21620

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Telephone: (301) 632-2582
Representative for the University: Douglas Nelson
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Richard B. Hills, Staff Development Officer
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Arlington County Public Schools, Arlington, Va. 22201

Joseph Guter, Staff Development Officer
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Fairfax County Public Schools, Fairfax, Va. 22150

Frank Elliott, Staff Development Officer
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Falls Church City Public Schools, Falls Church, Va. 22043

James Fox, Principal, George Mason High School
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Telephone: 676-7481

Fauquier County Public Schools, Warrenton, Va. 22186

Office: 10 Hotel Street, Warren Green Building
Telephone: (703) 347-2320
Representative for the University: John A. Morrow
Telephone: (202) 676-7015

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Alvin G. Sowards, Staff Development Officer
Mrs. Ruth D. Schulke, Supervisor, Elementary Education
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Telephone: (703) 777-2221
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Telephone: (202) 676-7481

Northern Virginia Community College, Annandale, Va. 22003

Representative for the University: John A. Morrow
Telephone: 676-7015

Prince William County Public Schools, Manassas, Va. 22110

William Helton, Director, Extension Education
Office: Tudor Lane
Telephone: (703) 791-3113
Representative for the University: Douglas Nelson
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Director, George Washington University Tidewater Center: Robert C. Sedwick
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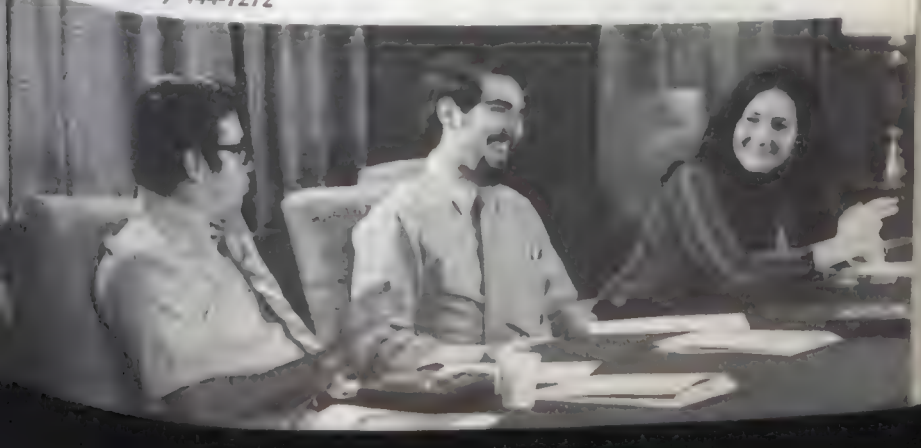
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Training Officer: LCDR G.D. Despiegler, USN
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U.S. Naval Station, Norfolk, Va. 23511

Education Director: LCDR Donald Whittaker, USN
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COURSES OF INSTRUCTION

ON THE FOLLOWING PAGES OF THIS CATALOGUE, under the alphabetical ranged names of the departments of instruction, are listed the courses struction. Courses carrying the designation "Campus Course" are no offered only on campus. The courses are subject to change. The Univ reserves the right to withdraw any course announced.

EXPLANATION OF COURSE NUMBERS

Courses are assigned triple numbers, all of which are listed in the *Off-ca Schedule of Classes*, published three times each year. The first is a serial ber assigned by the College of General Studies at the time of registration cating the location of off-campus centers. The second number is the nu assigned to the particular department. The third number, the only one o three which appears in this catalogue, is the course number assigned by department; this number indicates the academic level of each course, as follo

First-group courses.—Courses numbered from 1 to 100 are planned students in the freshman and sophomore years. With the approval of adviser and the dean, they may also be taken by juniors and seniors. In cer instances, they may be taken by graduate students to make up undergradu deficiencies or as prerequisite to advanced courses, but they may not be cr ited toward a higher degree.

Second-group courses.—Courses numbered from 101 to 200 are planned students in the junior and senior years. They may be taken for graduate cr only upon the approval of the dean and the instructor at the time of regis tion. Such approval is granted only with the provision that students must co plete additional work in order to receive graduate credit.

Third-group courses.—Courses numbered above 200 are planned primar for graduate students. They are open, with the approval of the instructor, qualified seniors; they are not open to other undergraduates. Qualified sen registering for Accounting, Business Administration, Health Care Administ tion, Management Science, or Public Administration courses must have a 3.0 average, the prior approval of the department chairman who is responsible the graduate course, the prior approval of the faculty adviser, and the approval of the Dean of the School of Government and Business Administra

SEMESTER HOURS OF CREDIT

The number of semester hours of credit given for the satisfactory complet of a course is, in most cases, indicated in parentheses after the name of the

course. Thus, a year course giving 3 hours of credit each semester is marked (3–3), and a semester course giving 3 hours of credit is marked (3). A semester hour usually consists of the completion of one fifty-minute period of class work or of one laboratory period a week for one semester.

ABBREVIATIONS

In the description of courses in this catalogue, the following abbreviations are used:

Acct	Accounting
AmCv	American Civilization
Anat	Anatomy
Anth	Anthropology
Art	Art
B Sc	Biological Sciences
B Ad	Business Administration
Cart	Cartography
Chem	Chemistry
Clas	Classics
Asia	East Asian Languages and Literatures
Econ	Economics
Educ	Education
Engl	English
Epid	Epidemiology and Environmental Health
ForS	Forensic Science
Fren	French
Geod	Geodesy
Geog	Geography and Regional Science
Geol	Geology
Geop	Geophysics
Germ	Germanic Languages and Literatures
HCA	Health Care Administration
Hist	History
Ital	Italian
L Am	Latin American Civilization
Mgt	Management Science
Math	Mathematics
Micr	Microbiology
Mus	Music
Ocea	Oceanography
Oral	Oral Biology
Phar	Pharmacology
Phil	Philosophy
PE	Physical Education, Health, and Recreation
Phys	Physics
P Sc	Political Science
Psyc	Psychology
P Ad	Public Administration
Rel	Religion
Slav	Slavic Languages and Literatures
Soc	Sociology
Span	Spanish
S Ed	Special Education
Sp&D	Speech and Drama
Stat	Statistics

Accounting

Chairman: A.J. Mastro, Associate Professor of Accounting; Government 302. Telephone: 676-6055

1–2 **Introductory Accounting** (3–3)

Basic understanding of accounting concepts, procedures, analyses, and reports: the accounting measurement and communication of significant economic and financial data. Prerequisite to Acct 2: Acct 1. Students who have received credit for Acct 115 cannot receive credit for Acct 1–2.

101 **Cost and Budgetary Control** (3)

Cost behavior and volume-profit relationships, responsibility accounting, standard costs, flexible budgets, cost structures for control and motivation, relevant costs, cost concepts. Prerequisite: Acct 1–2. Students who have received credit for Acct 193 or 215 cannot receive credit for Acct 101.

111 Financial Statement Analysis (3)

The analysis and interpretation of financial statements for the gu of management, directors, stockholders, and creditors. Prerequisite 1–2.

115 Survey of Financial Accounting (3)

Development, presentation, and interpretation of financial accountin necessary to the management process. Students who have received for Acct 1–2 cannot receive credit for Acct 115.

121 Intermediate Accounting (3)

In-depth study of accounting functions and basic theory: acquisiti assets and services, income and equity accounting, preparation and sis of financial statements. Prerequisite: Acct 1–2.

141 Governmental Accounting (3)

Appropriation, encumbrance, and fund accounting for governmental institutional entities. Prerequisite: Acct 1–2.

144 Federal Accounting (3)

Accounting procedures in the federal government, with emphasis agency-level accounts and accounting support for cost-based bud Prerequisite: Acct 141.

161 Federal Income Taxation (3)

Federal income tax concepts applicable to individuals and corporati differences between tax accounting and financial accounting.

171 Auditing (3)

Principles and procedures of auditing: generally accepted auditing st ards, internal control, audit objectives and reports, form-preparation of audit work papers, audit evidence. Prerequisite: Acct 121.

181 Accounting Systems (3)

Organization and use of accounting information: classification, cont and reporting; development, design, and installation of accounting s tems; accounting communication patterns. Prerequisite: Acct 101, 171

191 Advanced Accounting (3)

Application of accounting theory to special areas: consolidated statement business combinations, earnings per share, foreign exchange, price-lev adjusted statements, source and application of funds. Prerequisite: Ac 121.

193 Business Budgeting (3)

Principles and procedures in the development, installation, and operati of a system of budgetary control to aid management. Prerequisite: Ac 1–2. Students who have received credit for Acct 101 cannot rece credit for Acct 193.

215 Survey of Managerial Accounting (3)

Study of the nature, preparation, analysis, and interpretation of accoun ing reports primarily from the management point of view. Prerequisite Acct 1–2 or 115. Students who have received credit for Acct 101 cannot receive credit for Acct 215.

231 **Contemporary Accounting Theory** (3)

Accounting principles and concepts and recent theories concerned with the valuation and amortization of assets and determination of income. Prerequisite: 6 semester hours of accounting.

241 **Accounting and Related Disciplines** (3)

Interrelationships of accounting and behavioral sciences, economics, mathematical methods, operations research. Prerequisite: 6 semester hours of accounting.

262 **Business Income Taxation** (3)

Federal income tax concepts applicable to corporations, partnerships, and their owners; emphasis on tax planning factors in business decisions and tax research.

275 **Contemporary Auditing Theory and Procedures** (3)

Study of generally accepted auditing standards: internal control and internal auditing, application of statistical sampling to auditing, audit of electronic data processing systems. Prerequisite: Acct 1–2 or 115.

276 **Management Planning and Control** (3)

Integrative case study approach to management systems for planning, control, and decisions: value indices for organizational sub-units, transfer pricing, contemporary control systems, accounting framework and cycle. Prerequisite: Acct 1–2 or 115.

282 **Accounting Information Systems** (3)

Development and application of accounting system theory, including analysis, design, and implementation. Integration of automatic data processing, accounting systems, and management information systems. Prerequisite: Acct 1–2 or 115.

295 **Seminar in Accounting** (3)

Selected accounting studies: critical analysis and evaluation developed in seminar discussions and papers. Prerequisite: Acct 1–2 or 115.

American Civilization*

Director: B.M. Mergen, Assistant Professor of American Civilization, P-10, Telephone 676-6070

71–72 **Introduction to American Civilization** (3–3) (Campus Course)

Themes and issues in American civilization since Colonial times, with emphasis on their contemporary importance.

271 **Seminar: Research and Teaching in American Civilization** (3)

Consideration of American studies as an area for research and teaching; introduction to bibliography.

* Administered by the American Studies Program.

Anatomy

Chairman: To be announced.

*207 **Surgical Anatomy of the Head and Neck** (2)
Gross dissection of the head and neck. Lectures and demonstrations on the development, histology, and neuroanatomy of these regions.

Anthropology

Chairman: R.L. Humphrey, Jr., Associate Professor of Anthropology; X-11, Telephone 676-6075

1–2 **Introductory Anthropology** (3–3)
Anth 1: survey of man's origin, physical evolution, and culture history. Anth 2: survey of the world's cultures, illustrating the principles of cultural behavior.

201 **Seminar: the Nature and Scope of Anthropology** (3)
Survey of the development of anthropological thought; examination of the subject matter, methodology, and theoretical approaches of anthropology, especially as they relate to contemporary societies.

202 **Seminar: Recent Trends in Anthropology** (3)
Major topics of interest in contemporary anthropology since the mid-20th century will be taken up in order, stressing current journal and monograph materials.

Art

Chairman: F.S. Grubar, Professor of Art; Stuart Basement (front), Telephone 676-6085

31–32 **Survey of Western Art** (3–3)
Survey of the arts in the Western world from prehistoric to modern times. A foundation for further study in the history of art.

71–72 **Introduction to the Arts in America** (3–3)
Painting, sculpture, and architecture of America, with selected references to crafts and popular arts. Art 71: from Colonial beginnings to the Republican Age. Art 72: from early 19th century to the present.

110 **Contemporary Art** (3)
Painting and sculpture in 20th century Europe.

113 **Baroque Art in Italy** (3)
Development of painting, sculpture, and architecture in 16th and 17th century Italy.

* Open only to students in the program of study leading to the degree of Master of Science in Special Studies with a concentration in Oral Biology.

Biological Sciences

Chairman: A.H. Desmond, Professor of Zoology; Bell 314, Telephone: 676-6090

BIOLOGY

3–4 **Introductory Biology for Nonscience Majors** (3–3) (Campus Course)

Lecture (2 hours), laboratory (2 hours). Survey of biological principles; emphasis on man as a functional organism in his environment. Material fee, $12 a semester.

11–12 **Introductory Biology for Science Majors** (4–4) (Campus Course)

Lecture (3 hours), laboratory (3 hours). Biological principles and problems designed to furnish a base for advanced studies in biology and related sciences. Required of all prospective biology, botany, and zoology majors. Material fee, $15 a semester.

Business Administration

Chairman: H.R. Page, Professor of Business Administration; Government 302, Telephone: 676-6115.

51 **Introduction to Business** (3)

Structure, activities, and problems of business enterprise; its contribution to the individual and to society; careers in business.

101 **The Business Environment** (3)

Economic and legal environment of business enterprise; social and political influences; contemporary problems and issues.

102 **Fundamentals of Management** (3)

Planning, organizing, directing, coordinating, and controlling activities of the administrative unit; evolution of management thinking.

103 **Institutional Management** (3)

Philosophy of hospital administration: special services, food service, maintenance, internal review.

105 **Personnel Management** (3)

The labor force and labor markets. Industrial personnel and manpower programs, organization and policy in personnel activities.

106 **Problems in Personnel Management** (3)

Principles and problems of personnel management and industrial relations illustrated by cases drawn from industry and government. Prerequisite: B Ad 105.

107 **Collective Bargaining** (3)

American unionism and collective bargaining; economic, social, and public policy considerations. The negotiation and administration of collective bargaining agreements. Prerequisite: B Ad 105 or permission of instructor.

109 **Office Management** (3)

Organization and management of the office, office and information s tems, planning and execution of work, systems analysis supervision pr lems.

111–12 **Personnel Records Administration** (3–3)

B Ad 111: basic principles, techniques, and methods used in collecti processing, evaluating, and storing personnel records of all kinds. B A 112: problems and cases in special kinds of record-keeping and recor administration.

113 **Real Estate** (3)

Principles of urban real estate practice; leasing and property managemen valuation, appraisal, financing, taxation, urban growth, urban renewa

131 **Business Finance** (3)

Analyzing capital requirements and methods of acquiring funds: planning efficient use of capital. Asset management, financial analysis, sources o funds, capital budgeting, stockholder relationships. Prerequisite: Acct 1–2 Econ 1; Math 30, 31; Stat 51.

132 **International Business Finance** (3)

Principles, practices, problems, and institutions of international finance. Emphasis on international financial markets, exchange rates, balance-of- payments restraints, and governmental policies. Prerequisite: B Ad 131

135 **Managerial Finance** (3)

Functions and objectives of financial management; problems of internal financial analysis, forecasting, planning, and control; management of cor- porate capital; problems of capital supply. Prerequisite: B Ad 131.

138 **Investment and Portfolio Management** (3)

Theory and principles of security analysis and portfolio management, in- cluding analysis of the national economy, industry, company, and security markets. Risk-reward and computer-aided analysis. Prerequisite: Acct 1–2, B Ad 131.

141 **Basic Marketing Management** (3)

Marketing and marketing management, consumer and demand analysis, retailing, wholesaling. Emphasis on major decision areas and tools. Pre- requisite: Econ 1–2.

143 **Marketing Research** (3)

Principles and practices of marketing research; emphasis on basic methods and techniques, sources and interpretation of data, and presentation of re- sults. Prerequisite: B Ad 141.

158 **Physical Distribution Management** (3)

Distribution from shipper's point of view: problems of plant location, inventory control, warehousing; traffic management emphasized, including private carriage. Prerequisite: Econ 1–2.

161 **Commercial Law: Contracts, Sales, Agency, Bailments** (3)

162 **Commercial Law: Negotiable Instruments, Property, Mortgages** (3)

171 **Principles of Transportation** (3)

Impact of intercity transportation systems on society. Emphasis on modal differences in development, economic characteristics, and regulation. Prerequisite: Econ 1–2.

172 **Public Utilities** (3)

Legal and economic meaning of public utility concept; development, services, economic characteristics, rate-making, and regulation with emphasis on electric, gas, and telephone industries. Prerequisite: Econ 1–2.

173 **Transportation Systems Management** (3)

Comparative study, from the standpoint of various carrier modes, of management problems common to all modes of domestic and international transportation. Prerequisite: Econ 1–2.

174 **Urban Transportation** (3)

Problems of developing balanced transportation systems for urban areas—area needs, modal evaluation, cost effectiveness, finance, and marketing. Prerequisite: Econ 1–2 or equivalent.

175 **Introduction to Foreign Trade** (3)

Physical movement of goods in international business; conditions essential for successful trading; export shipment, documentation, procedural problems. Emphasis on ocean marine insurance and export traffic management policy. Prerequisite: Econ 1–2.

178 **Management of International Business Operations** (3)

Analysis of overseas projects according to purpose and type of organization; development and management of overseas operations in different world areas. Prerequisite: B Ad 175 or permission of instructor.

181 **Manufacturing Production** (3)

Basic principles and methods of manufacturing production. Manufacturing facilities, plant and equipment. Illustrations selected from various process and fabrication industries.

191 **Business Reports and Analyses** (3)

Sources of management information, array and analysis of data, interpretation and presentation of findings.

193 **Management Communication** (3)

Problems of communication: written communication, style and format, oral communication, oral briefing and presentation, group leadership, completed staff work, related subjects.

198 **Case Problems in Management** (3)

Principles and techniques of management illustrated by cases drawn from business and industry. Prerequisite: B Ad 102, 105, 131, 141.

202 **Relations of Government to Business** (3)

Regulatory and promotional activities of the government, independent regulatory agencies, antitrust activities, monetary and fiscal policy, regulation of labor-management relations.

208 **Personnel Management and Industrial Relations** (3)

Survey of personnel management practices and procedures, including labor-management relations.

209 Seminar: Personnel Management (3)

Industrial personnel and manpower management, research in advanced problems.

211 Leadership and Executive Development (3)

Theories of managerial leadership; issues and problems associated with leadership in large organizations and at higher management levels: executive selection and development. Prerequisite: Mgt 201 or permission of instructor.

212 Unionism and Collective Bargaining (3)

The American labor movement. Collective bargaining and the conduct of labor relations under collective bargaining agreements.

213 Current Issues in Unionism, Collective Bargaining, and Labor Relations (3)

Current problems and issues. Prerequisite: B Ad 212.

225 Seminar: Manufacturing Production (3)

Production technology, including new processes, materials, products, equipment, and facilities. Implications of emerging technology in managing the production function. Prerequisite: B Ad 181 or permission of instructor.

231 Financial Decision-making (3)

Functions and objectives of financial management, asset management, problems of internal financial analysis, rate-of-return analysis, financial forecasting, problems of capital demand and supply. Prerequisite: Acct 115 or equivalent, B Ad 131.

232 Capital Resource Management (3)

Problems of capital acquisition, costs, rationing, structure; dividend policy. Prerequisite: B Ad 231.

233 International Business Finance (3)

Analysis of problems in international business finance. Impact of the evolving international payments system on business. Prerequisite: B Ad 131 or equivalent.

237 Investment Analysis (3)

Risk-reward analysis of security investments including analysis of national economy, industry, company, and market; introduction to portfolio management; emphasis on theory and computer methods. Prerequisite: B Ad 131.

238 Seminar: Investment and Portfolio Management (3)

Portfolio management theory, application, and computer modeling. Independent research on investment analysis and portfolio management with emphasis on theory, cases, and computer applications. Prerequisite: B Ad 237.

241 Marketing Management (3)

Marketing management problems; market segmentation, product planning, channels of distribution, advertising, personal selling, sales promotion, pricing and development of integrated marketing programs.

243 **Seminar: Marketing Research** (3)

Research as an aid to decision-making and increased efficiency in marketing, marketing research process, critical appraisal of methods and results, applications.

248 **International Marketing** (3)

Organization for international marketing, demand analysis, product development and policies, marketing structure and trade channels, advertising and promotion problems and policies, pricing, and legal aspects. Effective international marketing strategy.

255 **International Trade** (3)

Public and private foreign trade institutions; principles and theories of international trade; role of foreign trade and investment in U.S. balance of payments; problems and changing patterns in the Western Hemisphere.

256 **Seminar: International Trade** (3)

Problems arising from economic integration; emphasis on European Economic Community; U.S. trade with developing nations; East-West trade problems and potential; foreign trade policy. Prerequisite: B Ad 255 or permission of instructor.

257 **Operation of the Multinational Firm** (3)

International market entry and expansion; operating policies, procedures, and problems of multinational companies; developing executives for international business. Prerequisite: advanced Master's degree standing.

261 **Managerial Microeconomics** (3)
(Formerly Managerial Economics I)

Applications of economic theory and statistics to business decisions involving demand, production, cost, profits, investments, and inventories. Prerequisite: Econ 217, Mgt 203, Stat 111 and 112; or equivalent; or permission of instructor.

262 **Managerial Macroeconomics** (3)
(Formerly Managerial Economics II)

Use of economic theory and statistics in business forecasting; interpretation of economic trends and developments; analysis of governmental economic policies. Prerequisite: Econ 218, Mgt 203, Stat 111 and 112; or equivalent; or permission of instructor.

275 **Seminar: Transportation** (3)

Problems and special areas of interest in transportation. Prerequisite: B Ad 171 or permission of instructor.

279 **Purchasing and Materials Management** (3)

Industrial purchasing and materials management principles and practices. Organization and functions in materials management. Determination of requirements, source selection, buying practices, policies, and ethics.

280 **Procurement and Contracting** (3)

Overview of procurment and contracting; emphasis on federal government buying policies, practices, and procedures.

282 **Government Contract Administration** (3)

Surveillance over contractor performance of contract. Rights and obligations; changes, suspension of work, default, convenience termination, in-

spection, warranties, procedures for the settlement of controversies on government contracts. Prerequisite: B Ad 280 or permission of instructor.

283 **Pricing and Negotiation** (3)

Scope and objectives of negotiated procurement; preparation, conduct, and recording of negotiations; analysis of cost, price, profit, investment, and risk; cost principles; incentives; relationship of contract type to work requirements; techniques of negotiation. Prerequisite: B Ad 280 or permission of instructor.

285 **Systems Procurement and Project Management** (3)

Development and procurement of major systems. Project management. Procurement planning—from concept formulation through contract definition, development, and manufacture. Prerequisite: B Ad 280 or permission of instructor.

293 **Business Research** (3)

Theory and practice in research methodology. Data sources and gathering, research models and designs, analysis and testing, controls, interpretation and presentation of findings. May be repeated once for credit.

295 **Business Decision Simulation** (3) (Campus Course)

Managerial decision-making in a diversified firm in a simulated competitive environment in which a complex situation is played out using computers. Prerequisite: advanced Master's or doctoral degree standing.

297 **Case Studies in Business Administration** (3)

Analysis of operational situations and policy issues. Developing and implementing solutions to managerial problems. Prerequisite: advanced Master's degree standing.

299 **Thesis Seminar** (3) (Campus Course)

Examination of thesis standards, research philosophy and methodology.

300 **Thesis Research** (3)

Cartography*

Program Adviser: Hyman Orlin, Professorial Lecturer in Geodetic and Cartographic Science, Telephone 946-3557

1–2 **Introduction to Cartography** (3–3)

The use of maps. History of mapping. Introduction to the fundamental concepts of topography, hydrography, and cartography. Characteristics and uses of different kinds of maps and charts, symbolization, representation of relief, geographic and grid coordinates, attributes of various projections, reliability. Making maps. Fundamental concepts of geodesy and geomorphology as applied to maps and charts, surveying methods, application to aerial photography, photo interpretation, map design, compilation and reproduction. Prerequisite to Cart 2: Cart 1.

* Affiliated with the Department of Geography and Regional Science.

103–4 **Photo Interpretation** (3–3)

Photo interpretation and its uses. History of photo interpretation. Fundamental concepts of image interpretation, topography, hydrology, vegetation, and man-features. Parameters affecting photo interpretation. Civil and military interpretation. Measurements, keys, and diagnostic techniques; reliability. Infrared and radar photo interpretation. Satellite photography. Prerequisite or concurrent registration: Geod 17. Prerequisite to Cart 104: Cart 103.

107 **Physiography** (3)

Development of physiographic concepts; the earth's crust, weathering, climate, and denudation; stream, shore, wind, and ice processes; glaciation; physiographic regions. Prerequisite: Cart 2.

108 **Climatology** (3)

Introduction, causes for climate and weather, air mass movements, water mass movements, physical features of boundaries. Tropics, subtropics, humid and dry continentals, subarctics.

111 **Cartographic Techniques** (3)

State-of-the-art orientation in the techniques and procedures currently used in cartographic agencies, including field methods, evaluation of source maps, use of scribing and contact screens in color separation, shaded relief, map reproduction, and associated managerial practices. Prerequisite: Cart 2.

112 **Advanced Cartography** (3)

Automated cartography, including computer-assisted map compilation, statistical mapping, automated color separation, and revision systems. Aerospace cartography, including orbital navigation, lunar, and planetary charting. Prerequisite: Cart 111.

Chemistry

Chairman: C.R. Naeser, Professor of Chemistry; Corcoran 104, Telephone 676-6120

PHYSICAL SCIENCE

3–4 **Fundamentals of Physical Science** (3–3) (Campus Course)

A year course for nonscience majors: credit toward a degree at this University given on completion of Chem 4. Lecture (2 hours), laboratory (3 hours). Selected topics from chemistry, physics, astronomy, and geology are integrated to introduce the nonscience major to the basic methods and achievements of physical science. Laboratory fee, $11 a semester.

CHEMISTRY

11–12 **General Chemistry** (4–4) (Campus Course)

A year course: credit toward a degree at this University given on completion of Chem 12. Lecture (3 hours), laboratory (3 hours), recitation (1 hour). Elementary course in general chemistry, including qualitative analysis. Prerequisite: one year of high school algebra. Laboratory fee, $18 a semester.

East Asian Languages and Literatures

Acting Chairman: Chung-wen Shih, Professor of Chinese; Suite 714, 2100 M Street. Telephone 676-7106

CHINESE

1–2 **Beginning Mandarin Chinese, Level I** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Asia 2. Classroom (3 hours), laboratory (1 hour). Fundamentals of grammar and pronunciation with graded reading and practice in writing. Laboratory fee, $17.50 a semester.

3–4 **Beginning Mandarin Chinese, Level II** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Asia 4. Classroom (3 hours), laboratory (1 hour). Continuation of grammar and spoken Chinese with more emphasis on the written language and reading. Prerequisite: Asia 2 or equivalent. Laboratory fee. $17.50 a semester.

Economics

Chairman: Henry Solomon, Professor of Economics; C-617. Telephone 676-6150

Departmental prerequisite: Except for Econ 217–18 and 220, Econ 1–2 is prerequisite to all other courses in Economics.

1–2 **Principles of Economics** (3–3)

Lecture (2 hours), recitation (1 hour). Survey of the major economic principles, institutions, and problems in contemporary life. Econ 1 is prerequisite to Econ 2.

121 **Money and Banking** (3)

Nature of money, credit, commercial banking, and other financial institutions in the U.S. monetary system.

*179–80 **U.S. Economic History** (3–3)

Process of economic growth from Colonial times to the present. Development of various sectors in the economy and their interdependence. Econ 179: 1607–1865. Econ 180: 1865 to present.

217–18 **Survey of Economics** (3–3)

For graduate students in fields other than economics; not open to graduate students in economics. Econ 217: price theory. Econ 218: income and employment theory. Departmental prerequisite waived.

220 **Survey of Principles and Issues in Economics** (3)

For students in the Master of Science in Administration degree program. Survey of economic theory and its application to contemporary economic problems. Departmental prerequisite waived.

* Interdepartmental course offered by the departments of Economics and History.

Education

Chairman: H.G. Detwiler, Professor of Education; C-514, Telephone 676-6940

Departmental prerequisite: A degree from an accredited institution and adequate professional preparation are prerequisite to courses in Education numbered from 201 to 400.

108 **Human Development, Learning, and Teaching** (3)

Lecture (2 hours), field work (3 successive hours each week, preferably in the morning, arranged by the Director of Laboratory Experiences). Principles of effective teaching based on an understanding of human development and the nature of learning. Prerequisite: Psyc 22; Psyc 29 or 112.

112 **Educational Measurement** (3)

Scope, needs, services to students, selection and construction of teacher-made tests, interpretation of tests for evidence purposes. Prerequisite: Educ 108 and 123.

113 **Elementary School Art** (3)

Lecture and laboratory (3 hours), field work—as arranged. For undergraduates in the elementary school curriculum. Materials and methods. Material fee, $5.

114 **Elementary School Music** (3)

For undergraduates in the elementary school curriculum. Program of music activities essential to basic musical understanding. Materials and techniques.

*115 **Elementary School Teaching of Reading** (3)

Introduction to methods, techniques, materials, and activities essential to a good elementary school reading program. Prerequisite: Educ 108 and 123, or teaching experience.

123 **Society and the School** (3)

Historical and social development of education, contemporary issues, cooperation of the school with other community agencies, functions of school personnel.

*128 **Children's Literature** (3)

Lecture (2 hours), field work (2 hours). Newer books for children and the children's classics, contribution of literature to child development, children's original expressions.

205–6 **The Curriculum** (3–3)

For experienced teachers. Educ 205: curriculum foundations and issues, comparison of curriculum patterns. Educ 206: curriculum development in subject areas, group consideration of student problems.

207 **Curriculum Materials** (3 to 6)

For experienced teachers. Construction of courses of study and classroom teaching aids, with direct application to students' situations.

*This course may not be taken by students who have completed or plan to enroll in Educ 111.

208 **Human Development** (3)

Contribution of various disciplines to an understanding of human development throughout the life span; emphasis on practical implications of relevant research.

209 **Child Development** (3)

Interdisciplinary approach to child development. Analysis, interpretation, and practical implications for instruction of research in disciplines contributing to a knowledge of child development.

210 **Adolescent Development** (3)

Interdisciplinary approach to adolescent growth and development. Analysis, interpretation, and practical implications for instruction of research in disciplines contributing to a knowledge of the adolescent.

212 **Educational Measurement** (3)

Basic measurement techniques: construction, selection, administration, and interpretation of objective and essay-type examinations; statistical analysis of test results; laboratory use of test instruments.

213–14 **History of Education** (3–3)

Educ 213: European backgrounds of American education. Educ 214: evolution of the American school system.

216 **Education of Slow-learning Children** (3)

Identification, nature, and needs of slow-learning elementary and junior high school children. Emphasis on diagnosis and treatment of learning difficulties.

217–18 **Philosophy of Education** (3–3)

Educ 217: to help students formulate a personal philosophy of education. Educ 218: social foundations of education—forces that shape policies and offerings of the school.

219 **Elementary School Classroom Procedures** (3)

Current theories of teaching and learning and their application to teaching acts and strategies of elementary school teachers.

223 **Foundations of Reading Instruction** (3)

Historical and psychological background; evaluation of recent methods, materials, and techniques in teaching reading; demonstrations of diagnostic and teaching techniques.

224 **Reading Problems** (3)

Elementary school reading difficulties; classroom and clinical techniques in testing and teaching. Prerequisite: one or more years of recent teaching experience and a previous course in reading or language arts.

226 **Reading in Secondary School and College** (3)

Methods, techniques, and materials necessary for developing efficient reading skills, including skills in content subjects; organizing and evaluating reading programs.

227 **Basic Issues in Elementary Education** (3)

Identification, definition, and analysis of some of the most important problems facing the contemporary American elementary school.

228 **Instructional Areas in Elementary Education** (3)

Current trends and research on reading, language arts, social studies, mathematics, science, music, art, and physical education.

229 **Administration of Elementary Education** (3)

For experienced teachers and administrators. Achieving instructional objectives, organizing and servicing teaching activities, coordinating school and community life.

231 **Secondary School Classroom Procedures** (3)

Current classroom practices: teacher-pupil planning, group procedures, initiatory and culminating activities, individual and group evaluation techniques, teaching aids, etc.; review of recent literature.

232 **Supervision of Elementary Education** (3)

For experienced teachers and administrators with two or more years of teaching experience. Review of modern supervisory concepts including practices in the operation of the elementary school.

233 **Audio-visual Education** (3)

Lecture (2 hours), laboratory (1 hour). Selection, evaluation, and use of audio-visual materials; administrative problems in care, operation, maintenance, and use of such materials and equipment. Material fee, $7.

241 **Education of the Gifted** (3)

For classroom teachers. Nature and discovery of giftedness, provisions for the gifted in regular classes, experimental projects.

243 **Human Relations in Education** (3)

Principles and practices in human relations between and among learner, teacher, other school personnel, and parents.

245 **School and Community** (3)

The school as an important member of a team of social agencies that builds the community.

247 **Adult Occupational Education** (3)

Development, current concepts, agencies involved, problems, and trends in adult vocational-technical-occupational education in the United States and foreign countries.

251 **Foundations of Guidance and Personnel Services** (3)

Introductory survey: definitions, scope, principles, historical background, organization, services, emerging trends, and issues.

252 **Organization and Administration of Guidance Services** (3)

Procedure and practice in organizing and administering school guidance and pupil personnel programs. Admission by permission of instructor.

253 **Analysis of the Individual for Purposes of Counseling** (3)

Detailed study of individual analysis and appraisal techniques. Development of systematic case study. Prerequisite: Educ 112 or equivalent.

254 **The Middle School** (3)

Purposes, organization, core program, guidance, developing course of study, extra-classroom activities.

255–56 **Secondary Education** (3–3)

Educ 255: current proposals for improvement of secondary education. Educ 256: current problems in each subject-matter field.

257 **Educational and Occupational Development** (3)

Theories of career development: factors influencing the world of work: procedures for evaluating and using socio-personal, educational, and occupational information.

259 **Secondary School Administration** (3)

For experienced teachers and administrators. Survey of administration including practices of the modern high school.

260 **Secondary School Supervision** (3)

For experienced teachers and administrators. Review of modern supervisory concepts, including practices in schools.

269–70 **School Business Management I–II** (3–3)

Educ 269: philosophy, responsibilities, and functions of the business management office in public education institutions. Educ 270: practicum in educational business management.

271 **The Teacher and School Administration** (3)

Role of federal, state, and local administrative units; school finance; legal controls; school plant; public support; improving teaching conditions.

272 **The Teacher and School Supervision** (3)

Nature, organization, human relationships, and techniques.

275 **Seminar: School Finance** (3)

Educational financial theory, practice, and control, including methods of financing.

276 **Seminar: Public Relations in School Administration** (3)

Purposes, gathering materials, disseminating agencies, publicity media, public participation in policy-making.

278 **School Law** (3)

Sources and scope of school law; legal rights and responsibilities of teachers, pupils, and taxpayers. Other legal problems of major interest to the group.

283 **Higher Education in the United States** (3)

Development, scope, purposes, present status, programs, and trends in higher education in the United States.

284 **Administration of Higher Education** (3)

Government, organization, and administration of colleges and universities; duties of trustees and administrators.

285 **Student Activities** (3)

Nature and purposes of selected activities—homeroom, clubs, assemblies, school publications, student council, interscholastic contest; attention to sponsorship, participation, finance, and evaluation.

291 **Planning the School Plant** (3)

Selection of sites; evaluation of existing buildings; utilization of present facilities; adaptation to curricular needs; building, operation, and maintenance problems.

295 **Research Methods and Procedures** (3)

Required of all candidates for graduate degrees in Education. To be taken early in the graduate program.

297 **Personnel Administration** (3)

Organization and administration of personnel programs for educational institutions. Basic philosophy, principles, responsibilities, and functions.

298 **Seminar: Personnel Administration** (3)

Research: policies, rules and regulations, staff organizations, negotiations.

299–300 **Thesis Research** (3–3)

301 **Data Processing in Education** (3)

Machine accounting and computer technology for counselors, teachers, and administrators.

316 **Curriculum Developments in Elementary School Social Studies** (3 to 6)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school social studies curriculum. Admission by permission of instructor.

317 **Curriculum Developments in Elementary School Science** (3 to 6)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school science curriculum. Admission by permission of instructor.

320 **Curriculum Developments in Elementary School Mathematics** (3 to 6)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school mathematics curriculum. Admission by permission of instructor.

354 **Counseling of Minority Groups** (3)

Consideration of problems and approaches related to counseling cultural and racial minorities in American society; emphasis on counseling the disadvantaged in urban areas.

355 **Counseling in Groups** (3)

Principles of group dynamics as related to interaction within groups. Techniques and practice in group counseling.

357 **Mental Hygiene** (3)

Mental health problems: emphasis on needs of counselors, teachers, and others working with children and adolescents.

371 **Introduction to College Teaching** (3)
(Formerly Principles and Methods of College Teaching)

General principles, methods, techniques, and experimental instructional media for teaching at the college and university level.

372 **Internship in College Teaching** (3 to 6)

Supervised experience in a selected area of college teaching. Prerequisite: Educ 371. Admission by permission of instructor.

373 **The Junior-Community College** (3)

The two-year college as it relates to secondary education, four-year colleges, and universities. Objectives, curricula, students, faculty, legal concerns, and special problems of two-year colleges.

374 **Current Issues in Higher Education** (3)

Prerequisite: Educ 283, 284.

380 **Sensitivity Training: Laboratory Method** (3)

A sensitivity learning experience in human relations using unstructured group experience, individual feedback, experimentation, and practice. Admission by permission of Department, prior to registration.

381 **The Adult as a Learner** (3)

Psychology of learning as applied to adults; effect of age on learning; physical and social environment in adult education situations.

382 **Methods in Adult Education** (3)

Methods, techniques, and devices in adult education; traditional methods, developing action-oriented learning situations, programmed instruction, and systems approach in developing training programs.

383 **Counseling of Adults** (3)

Theories and practical applications of occupational counseling, emphasizing distinct needs of adults and young adults; primarily intended for counselors in military, government, business, and industrial organizations.

384 **Evaluation of Adult Education** (3)

Measurement and evaluation of adult education in school and nonschool agencies—business, industry, government, voluntary organizations, and community.

390 **Legal Problems in Higher Education** (3)

Investigation of legal problems in higher education related to administration, students, faculty, and academic program.

391 **College and University Curriculum** (3)

Development, patterns, creative design, issues, problems, evaluation, and trends in the higher education curriculum.

392 **Financing Higher Education** (3)

Analysis of private, state, and federal revenue sources; student aid, program budgets, and financial methods and practices.

394 **College and University Governance** (3)

(Formerly Administration and Governance in Higher Education)

Organizational and administrative structures, patterns, and relationships in higher education. Prerequisite: Educ 284.

395 **Problems and Practices in School Administrative Organization** (3 to 6)

Application of principles and supervision concerned with change and evaluation of administrative organization.

399 **Seminar: Applied Educational Administration** (3 to 6)

Application of the theories and principles of administration to the public schools. Student participation with guidance by recognized regional practitioners.

English

Acting Chairman: J.P. Reesing, Jr., Professor of English; Stuart 407, Telephone 676-5180

Before students are registered in Engl 1, they are tested in the minimum essentials of vocabulary, spelling, grammar, standard usage, and writing skill. Those students who show marked superiority may, upon passing further tests, be exempted from one or both halves of the English Composition course; those who are inadequately prepared for Engl 1 will be assigned to *Basic English*. In lieu of *Basic English*, off-campus students may, if they desire, be given permission to register for Engl 1*x* on campus. Engl 1 or 1*x* is prerequisite to all other courses in English.

ENGLISH COMPOSITION

X **Basic English** (0)

Instruction, drill, and exercises in grammar, vocabulary, spelling, and mechanics in general; instruction and exercises in composition and reading. This course is designed to prepare students for Engl 1. No academic credit. Tuition fee, $120.

1 **English Composition: Language as Communication** (3)

Study and practice of expository techniques; emphasis on the rhetorical complexities of unity, development, organization, and coherence, by analysis of selected current books; library research procedure.

1*x* **English Composition: Language as Communication** (3)
(Campus Course)

Intensive course in English grammar and composition for students inadequately prepared for Engl 1. Begins with detailed instruction, drill, and exercises in basic structure of the English language and in writing paragraphs; continues with content of Engl 1. Engl 1*x* meets five hours a week and carries 3 semester hours of credit. Total fee, $265 (tuition of $240 plus additional fee of $25).

2 **English Composition: Language and the Arts and Sciences** (3)

Study and practice of expository and argumentative techniques; emphasis on the rhetorical complexities of the sentence and of diction, and on logical thought, by analysis of selected books on the nature of language and of the arts and sciences. Prerequisite: Engl 1 or 1*x*.

11 **The Writing of Reports** (3)

Theory and practice in the writing of technical reports. Prerequisite: Engl 1 or 1*x* and 2.

HUMANITIES

43–44 **Classical Humanities** (3–3)
(Formerly Hum 3–4)

Interdisciplinary study of the origins of Western thought. Reading and intensive class discussions of selections from the Bible and of five works each semester from the following authors: Homer, Hesiod, Aristophanes, Plato, Aristotle, Aeschylus, Euripides, Sophocles, Herodotus, Thucydides, Lucretius, Marcus Aurelius, Epictetus, Polybius, St. Augustine. Background lectures on the major intellectual, artistic, economic, and social movements.

45–46 **Humanities in the Modern World** (3–3)
(Formerly Hum 1–2)
Interdisciplinary study of modern Western thought from the Renaissance to the 20th century. Reading and intensive class discussion of five works each semester from the following authors: Machiavelli, Pope, Voltaire, Rousseau, Goethe, Tolstoy, J.S. Mill, Zola, Nietzsche, Kierkegaard, Freud, Kafka, Koestler, T.S. Eliot. Background lectures on the major intellectual, artistic, economic, and social movements.

ENGLISH LITERATURE

51–52 **Introduction to English Literature** (3–3)
Historical survey.

91–92 **Introduction to European Literature** (3–3)
Consideration of various types.

AMERICAN LITERATURE

71–72 **Introduction to American Literature** (3–3)
Historical survey. Engl 71: from the beginnings to the Civil War. Engl 72: from the Civil War to present.

Epidemiology and Environmental Health

Chairman: J.W. Millar, Vivian Gill Professor of Epidemiology and Environmental Health; School of Medicine, Telephone 331-6117

1 **Principles of Environmental Health I** (2)
Communicable disease: recognition, mode of spread, general methods of control, immunization, quarantine, disinfectants, and insecticides.

2 **Principles of Environmental Health II** (2)
Water, its relationship to man's well-being. Disposal of human wastes—excreta and refuse; atmospheric pollution.

3 **Principles of Environmental Health III** (2)
Food, housing (urban and rural), institutional sanitation, radiological sanitation, insect vector, and rodent control.

101 **Environmental Sanitary Science I** (2)
Water: general characteristics (urban and rural), treatment and distribution; public bathing place sanitation; design and function of water treatment facilities.

102 **Environmental Sanitary Science II** (2)
Recognition and control of environmental pollution. Treatment and disposal of human wastes—excreta, refuse, and air.

103 **Environmental Sanitary Science III** (2)
Dairy products and food sanitation; processing, storage, and distribution of food. Supervision and training of personnel involved with food and the food industry.

104 **Environmental Sanitary Science IV** (2)

Housing, urban and institutional; heating, ventilation, lighting, and noise. Study of federal and municipal regulatory aspects.

105 **Air Pollution Abatement** (2)

Association of air pollution and disease and the effects of major pollutants on man. Air measurement and air measurement techniques demonstrated.

121 **Environmental Biostatistics** (2)

Statistical reasoning, collection of data, rates, incidence, and prevalence. Generalization of observations and use of measurement data.

122 **Environmental Epidemiology I** (2)

Infectious diseases: bacterial, viral, rickettsial, protozoal, and helminthic.

123 **Environmental Epidemiology II** (2)

Zoonoses, deficiency diseases, chronic disease, pneumoconiosis, mental health, maternal and child health.

131 **Environmental Epidemiology III** (1)

Venereal disease: etiology, clinical manifestations, diagnosis; prevention and control of syphilis, gonorrhea, chancroid, granuloma inquinale, and LGV.

141 **Public Health Entomology I** (2)

How the arthropods affect man. Study of host-parasite vector relationships; principles of systematic biology and basic insect taxonomy and toxicology.

142 **Public Health Entomology II** (2)

Identification, life cycles, and bionomics of medically important insects and other arthropods.

143 **Public Health Entomology III** (1)

Study of chemical, biological, and mechanical control of all medically important arthropods.

144 **Public Health Entomology IV** (1)

Prevention and control of rodent infestation; identification, habits, and relationship to man.

151 **Public Health Microbiology I** (3)

Medical parasitology, protozoology (intestinal), the Haemosporidia (malaria), the Haemoflagellates and the metoza (helminths) of medical importance.

152 **Public Health Microbiology II** (2)

Clinical bacteriology, characteristics and identification of the bacteria involved in disease, study of rickettsia and viruses.

153 **Public Health Microbiology III** (2)

Study and identification of the flora of water, dairy products, food, and the atmosphere.

154 **Public Health Microbiology IV** (1)

Mycology: study of medically important fungi, systematic mycoses and dermatomycoses.

171 **Industrial Hygiene I** (2)

Chemical hazards: study of diseases from chemical exposure, toxic dusts, metal fumes and vapors, gases, and organic compounds.

172 **Industrial Hygiene II** (2)

Physical hazards: biological effects of low and high temperatures, radiation (electromagnetic, ultraviolet, ionizing), illumination, sound, pressure, and atmospheric pollution.

191 **Public Health Administration I** (1 to 3)

Activities and organization; philosophy, background, and development. Public health activities include vital statistics, laboratory services, education, nursing, and social services.

192 **Public Health Administration II** (1 to 3)

Administrative considerations, including governmental aspects, legal considerations, fiscal management, personnel factors, and public relations in public health organizations. Prerequisite: Epid 191.

231 **Veneral Disease in the Community** (3)

A survey course to develop an understanding of venereal disease problems. Etiology, clinical manifestations, diagnosis, prevention, and control. For parents, school teachers, health personnel, and other educators.

293 **Public Health Administration** (3)

Principles and practices: ecology approach in planning community health services; interplay of social, cultural, political, and economic factors. Open to qualified undergraduates with permission of instructor.

Forensic Science

Chairman: T.P. Perros, Professor of Chemistry; Samson 205, Telephone 676-6480, or E-30, Telephone 676-7320

Note: Students registering for 3-semester-hour Forensic Science course designated the same as a 2-semester-hour Law course must make special arrangements with the instructor for supplementary assignments equivalent to one additional semester hour. These courses are offered only on campus.

201 **Forensic Science in Law Enforcement I: Serology, Microscopy, Mineralogy** (3)

Principles in forensic serology; microscopic and optical analyses of human and animal reproductive cells, hairs, natural and synthetic fibers, and materials of a mineral nature.

202 **Forensic Science in Law Enforcement II: Instrumental Analysis** (3)

Theories and principles of instrumental analysis, including emission spectrography, X-ray spectrography and diffractometry, infrared, and ultraviolet methods of identification and analysis.

203 **Forensic Science in Law Enforcement III: Examination of Questioned Documents** (3)

Theory and principles of handwriting and handprinting, duplicating proc

esses, paper manufacture, and fiber analysis; studies of paper and methods of examination of questioned documents.

204 **Forensic Science in Law Enforcement IV: Firearms and Tool-mark Identification** (3)

Study of methods for identifying firearms, cartridge casings, tool marks, tire marks, and footprints of significance in criminal procedures.

224 **Introductory Criminal Procedure, Evidence and Legal Methods** (3)

Principles of criminal procedure, preparation and presentation of evidence, examination of witnesses, and the methods of legal research.

225 **Advanced Criminal Evidence** (3)
(Formerly ForS 205)

Study of procedural rules affecting the collection, accessibility, and use of physical evidence with emphasis on court opinions defining the rules of search and seizure. Prerequisite: ForS 224.

226 **The Crime Lab, the Forensic Scientist, and the Criminal Lawyer** (3)
(Formerly ForS 206 The Scientist as an Expert Witness)

Same as Law 437 (2). Qualifications and preparation of an expert witness and the relationships and responsibilities of the expert in criminal and civil cases. Prerequisite: ForS 224.

227 **Advanced Criminal Procedure** (3)
(Formerly ForS 207)

Same as Law 334 (2). Decision to arrest, prosecutive discretion, bail, the preliminary hearing, right to a speedy trial, discovery, plea bargaining, publicity, post-conviction procedures. Prerequisite: ForS 224.

228 **Administration of Criminal Justice** (3)
(Formerly ForS 208)

Same as Law 472 (2). Consideration and analysis of selected advanced problems in the administration of criminal justice. Emphasis will be placed on the role and professional responsibilities of prosecutor and defense counsel and on development trends in the law. Prerequisite: ForS 224.

229 **The Police and the Community** (3)
(Formerly ForS 209)

Same as Law 477 (2). Problems and potential of contemporary urban law enforcement: the role and perspective of the police officer. Prerequisite: ForS 224.

230 **Forensic Medicine** (3)
(Formerly ForS 210)

Same as Law 390 (2). Survey of interprofessional relations between physicians and lawyers in the office, hospital, and courtroom; incidental attention to laboratories, legislatures, and administrative agencies. Prerequisite: ForS 224.

231 **Law and Criminology I: Search for the Causes of Criminal Behavior** (3)
(Formerly ForS 211)

Same as Law 475 (2). Role which knowledge of crime causation may play in assessing devices to control deviant behavior: factors related to criminal behavior; current causal theories. Prerequisite: ForS 224.

232 **Law and Criminology II: Society's Responses to the Criminal Offender** (3)
(Formerly ForS 212)
Same as Law 476 (2). Study of punitive, mechanical, and correcti approaches to offenders. Emphasis on changing responses to criminal delinquent behavior, and research on effectiveness. Prerequisite: ForS

233 **Post-conviction Dispositions—Dynamics of the Law of Criminal Corrections** (3)
(Formerly ForS 213)
Same as Law 478 (2). Study of statutes, practice, problems, and poter of alternatives facing a defendant: mental fitness to proceed to trial, bation, sentencing, parole, prisoner rights. Prerequisite: ForS 224.

254 **Seminar: Recent Developments in Forensic Science** (2)
Studies of current advances and problems in law and science relating forensic science.

260 **Introduction to Human Physiology and Pathology** (2)

261 **Introduction to Forensic Pathology** (2)

262 **Current Trends in Forensic Pathology and Forensic Odontology** (3)

263 **Seminar: Law and Forensic Sciences** (3)

264 **Medical Jurisprudence** (3)

265 **Criminal Procedure in Forensic Medicine** (2)

266 **Forensic Neuropathology** (3)

267 **Application of Histochemistry to the Forensic Sciences** (3)

268 **Photography in the Forensic Sciences** (1)

295 **Research** (arr.)
Open to qualified Master's degree students. Research on problems proved by the departmental advisers. May be repeated for credit.

299–300 **Thesis Research** (3–3)

French*

Chairman: J.F. Burks, Professor of French; A-11, Telephone 676-6330

Placement Examination: A student who has not been granted advanced stand and who wishes to continue in college the language begun in high school must ta a placement examination before registration. Upon completion of the examinati assignment is made to the appropriate course.

1–2 **First-year French** (3–3) (Campus Course)
A year course: credit toward a degree at this University given on comp tion of Fren 2. For beginners. Pronunciation, conversation, gramm

* Administered by the Department of Romance Languages and Literatures.

composition, reading of modern French prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester.

3–4 **Second-year French** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Fren 4. Conversation, grammar, composition, reading in modern French prose, introduction to French civilization. Aural training, oral practice in language laboratory. Prerequisite: Fren 1–2, or two years of high school French. Laboratory fee, $17.50 a semester.

Geodesy*

Program Adviser: Hyman Orlin, Professorial Lecturer in Geodetic and Cartographic Science; Telephone 946-3557

12 **Plane Surveying** (3)

Theory and practice in measurement of distances, angles, and elevations; traversing, leveling, and triangulation; stadia surveying, plane coordinate computations, and miscellaneous surveying problems. Prerequisite: Math 6 or equivalent.

13 **Geodetic Surveying** (3)

Elements of geodetic and hydrographic surveys; electronic measurements, triangulation, trilateration, and precise traverses; geodetic leveling and precise trigonometric leveling; introduction to geodetic astronomy and to least squares adjustment. Prerequisite: Geod 12 or permission of instructor.

17 **Elementary Photogrammetry** (3)

Fundamentals of aerial photography, photogrammetric optics, and photographic processes; mathematics of vertical and tilted photographs; stereoscopy and parallax; planning and executing the photogrammetric project; radial triangulation methods; photomaps; oblique and terrestrial photography. Prerequisite: Cart 2, Geod 12; or permission of instructor.

18 **Intermediate Photogrammetry** (3)

Basic photogrammetry theory and practice. Stereoscopic plotting instruments; graphical and computational methods for adjusting strips of aerotriangulation; electronic computers. Method of least squares applied to photogrammetry. Prerequisite: Geod 17.

110 **Map Projections** (3)

Mathematics of projections; geometry of sphere and ellipsoid; distortions; conic, cylindrical, and azimuthal projections; geodetic projections. Prerequisite: Math 32.

117 **Advanced Photogrammetry** (3)

Analytic photogrammetry. Prerequisite: Geod 18, Math 33.

155 **Elementary Geodesy** (3)

Principles and formulas basic to theoretical and applied geodesy, with application to special problems; computations on an ellipsoid, gravimetry,

* Affiliated with the Department of Geography and Regional Science.

deflection of the vertical and Laplace's equation, introduction to satell geodesy. Prerequisite: Geod 13, Math 32; or permission of instructor.

156 **Geodetic Astronomy** (3)

Principles and formulas for the astronomic determination of longitud time, azimuth, and latitude; star catalogues; observing and time-recordi instruments; practice in observing and computation. Prerequisite: Geo 13, Math 32; or permission of instructor.

160 **Mathematics of Adjustments and Least Squares** (3)

Types and distribution of errors, Gaussian and Poisson distributions, fu damentals of matrix algebra with special emphasis on least squares adjus ment. Prerequisite: Geod 155, Math 33.

161 **Adjustments in Geodesy and Photogrammetry** (3)

Adjustment theory and special adjustment problems. Prerequisite: Geo 160.

Geography and Regional Science

Chairman: Marvin Gordon, Associate Professor of Geography and Regional Science, I-200, Telephone 676-6185

51 **Introduction to Geography** (3)

General survey of the various systematic, physical, and human fields of geography which play a role in the analysis and interpretation of man-environment relationships in both spatial and ecological contexts.

52 **World Regional Patterns** (3)

Emphasis on spatial aspects of man's activities within a world regional framework.

126 **Economic Geography** (3)

Consideration of theories and hypotheses concerning the location of economic activities: services, manufacturing, and agricultural production. Exercises in computer-oriented locational analysis.

127 **Population and Settlement** (3)

Patterns of world population; factors contributing to population pressures, growth, and migrations.

132 **Resources and Environment** (3)

Analysis of the spatial pattern of resources and the problems created by man's utilization of unevenly distributed resources.

141 **Urban Settlement** (3)

Distribution of urbanization on the surface of the earth: processes which lead to urbanization; theories which can be used to analyze the location of cities.

146 **Political Geography** (3)

Analysis of the interrelationships between the political community and the human and physical environment.

148 **Principles of Geography** (3)

Study of geographic principles, technology and tools designed to meet specific needs of teachers. Emphasis on the practical application of geographic concepts and the use of source materials in the classroom.

153 **Europe** (3)

Survey of the cultural and physical regional patterns of both Western and Eastern Europe.

161 **Latin America** (3)

Examination of spatial characteristics of physical and cultural phenomena in Middle and South America.

208 **New Perspectives in Geography** (3)

An overview of recent trends in geographic research. Selected topics include diffusion processes, spatial behavior, locational analysis, and environmental perception.

224 **Seminar: Political Geography** (3)

Study of the spatial relationships between the political community and environment.

eology

airman: Geza Teleki, Professor of Geology; Bell 3, Telephone 676-6190

1–2 **Introductory Geology** (3–3) (Campus Course)

Lecture (2 hours), laboratory (2 hours), optional field trips. Survey covering the principles of geology; emphasis on man's effect on the environment. Laboratory fee, $12 a semester.

3 **Introductory Geology** (3)

Survey covering the principles of geology. Nonlaboratory course for off-campus students only.

4 **Introductory Geology** (3)

Geological periods, evolution of life on earth. Nonlaboratory course for off-campus students only. Prerequisite: Geol 1 or 3, or permission of instructor.

125 **Marine Geology** (3)

Lecture and map work. Principles of oceanography and submarine geology; topography, crustal structure, sedimentary processes, and marine environment. Prerequisite: Geol 1–2.

141 **Introductory Geochemistry** (3) (Campus Course)

Lecture (2 hours), laboratory as arranged. Principles and theories on the abundance, relationships, and distribution of the elements in various rock and mineral species. Prerequisite or concurrent registration: Geol 117 or equivalent; Chem 11–12; Math 30; Phys 1, 2; or permission of instructor. Laboratory fee, $12.

Geophysics*

Program Adviser: Hyman Orlin, Professorial Lecturer in Geodetic and Cartographic Science; Telephone 946-3557

105 **Elementary Geophysics** (3)

Introduction to geophysics; origin of the earth, geochronology, seismology, gravity, and geomagnetism. Prerequisite: Geol 1 or 3, Math 32; or permission of instructor.

106 **Interpretation Theory—Geophysics** (3)

Development of mathematical and physical foundations for interpreting seismic, gravimetric, and magnetic data. Prerequisite: Geop 105.

115 **Elementary Seismology** (3)

Principles of seismographs; analysis of stress and strain, interpretation of earthquake seismograms, location of earthquakes; seismic waves in the earth and the structure of the earth's interior as deduced from geophysical data, earthquake magnitude energy and intensity, seismic risk and the effects of earthquakes, review of earthquake activity throughout the world. Prerequisite: Geop 105.

Germanic Languages and Literatures

Chairman: Carl Steiner, Associate Professor of German; Rice 404, Telephone 676-6195

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

1–2 **First-year German** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Germ 2. Essentials of German grammar; reading of easy prose. Aural-oral practice in language laboratory. Laboratory fee, $17.50 a semester.

3–4 **Second-year German** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Germ 4. Selections from modern German prose; continuation and review of grammar. Aural-oral practice in language laboratory. Prerequisite: Germ 1–2 or equivalent. Laboratory fee, $17.50 a semester.

Health Care Administration

Chairman: Leon Gintzig, Professor of Hospital Administration; CC-11, Telephone 676-6220

153–54 **Survey of Health Care Organization and Procedures** (3–3)

Introduction to the history, concepts, and activities of health care systems in this country. Emphasis on organization and procedures. Prerequisite

* Affiliated with the Department of Geography and Regional Science.

to HCA 154: HCA 153 or permission of instructor. Not open to Master's degree candidates in Health Care Administration.

161 **Management of the Hospital Nursing Unit** (3)
(Formerly Educ 161)

Analysis of nursing today, the hospital, structure and changing functions, basic concepts of management personnel practices and activities, interpersonal relationships, legal aspects and safety factors, economics—inventories, and evaluation procedures of the hospital nursing unit. Not open to Master's degree candidates in Health Care Administration.

202 **Introduction to Health Care** (3)

Lecture and discussion (2 hours), laboratory (2 hours). Survey of organization, functions, trends, and issues among governmental, nongovernmental, voluntary sectors; survey of major diseases by organ systems and their impact on administration and planning; medical terminology.

203 **Health Care Organization and Management** (3)

Lecture and discussion (2 hours), laboratory (2 hours). History and current character of institutional health care. Organizational functions and structure of various kinds of health care facilities. Prerequisite or concurrent registration: Mgt 201.

205 **Hospital Management Procedures** (3)

Lecture and discussion (2 hours), laboratory (2 hours). Departmental administration. Survey of hospital law; hospital forms, procedures, and systems; and hospital programs pertaining to disaster relief, safety, fire prevention.

209 **Health Care Economics and Financial Management** (3)

Lecture (2 hours), laboratory (2 hours). Economic and financial analysis of the interactions between consumers and providers of health care, and public and private prepayment and insurance programs. Industry price structure and the long- and short-term capital requirements.

250 **Mental Health Facilities and Resources** (3)

Functional services, organization, administration, and management of mental health facilities—public and private mental hospitals, psychiatric units and services in general hospitals, community mental health centers, outpatient psychiatric clinics, and institutions for mental retardation.

brew*

irman: J.E. Ziolkowski, Assistant Professor of Classics; T-22, Telephone 676-6127

lacement Examination: A student who has not been granted advanced standing who wishes to continue in college the language begun in high school must take acement examination before registration. Upon completion of the examination, nment is made to the appropriate course.

21–22 **First-year Hebrew** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Clas 22. Study of the elements of Hebrew; emphasis on sources

*inistered by the Department of Classics.

of the language, reading comprehension, writing facility, and conversation.

23–24 **Second-year Hebrew** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Clas 24. Review of grammar; continued development of reading comprehension, writing facility, and conversation. Selections from Hebrew text of the Old Testament and other materials.

History

Chairman: C.J. Herber, Associate Professor of European History; Stuart 419, Telephone 676-6230

Departmental prerequisite: Hist 39–40 or 91–92 is prerequisite to courses 108 through 158 and 187 through 196; Hist 71–72, to courses 167 through 186; either Hist 39–40, 71–72, or 91–92, to courses 162 through 166. Prerequisite to Hist 105–6 is either Hist 39–40, 91–92, or a background in a science. Students may waive one or more of the prerequisite courses by passing a departmental waiver examination. By attaining scores of 600 or above on the College Entrance Examination Board Achievement tests, or by good performance on Advanced Placement Examinations.

39–40 **European Civilization in Its World Context** (3–3)

Hist 39: political, social, economic, and cultural history to early modern era. Hist 40: from early modern era to present. Students who receive credit for Hist 39–40 cannot receive credit for Hist 91–92.

71–72 **Introduction to American History** (3–3)

Hist 71: political, social, economic, and cultural forces of the United States in their world setting from 1492 to 1861. Hist 72: from 1861 to present.

91–92 **World Civilizations** (3–3)

Hist 91: major civilizations of the world to 1500. Hist 92: Europocentric and world civilization since 1500. Students who receive credit for Hist 91–92 cannot receive credit for Hist 39–40.

145–46 **History of Russia** (3–3)

Rise and revolution of Russia. Hist 145: the Old Regime, 800–1900. Hist 146: Revolution and Soviet rule since 1900.

149–50 **European Diplomatic History** (3–3)

Emphasis on policies and actions of the great powers and their statesmen. Hist 149: to 1890. Hist 150: since 1890. Students who receive credit for Hist 150 cannot receive credit for Hist 157.

163–64 **History of Latin America** (3–3)

Political, social, and cultural development. Hist 163: through independence. Hist 164: the national period.

*179–80 **U.S. Economic History** (3–3)

Process of economic growth from Colonial times to the present. Development of various sectors in the economy and their interdependence. Hist 179: 1607–1865. Hist 180: from 1865 to present.

* Interdepartmental course offered by departments of History and Economics.

181–82 **U.S. Diplomatic History** (3–3)

Survey of American foreign relations from the era of the American Revolution. Hist 181: to 1898. Hist 182: the 20th century.

195–96 **History of East Asia** (3–3)

Civilizations of China and Japan; emphasis on institutional development and social organization. Hist 195: beginnings to about 1800. Hist 196: from eve of the modern era to present.

201 **History and Historians** (3)

Students who receive credit for Hist 201 cannot receive credit for Hist 199.

Italian*

Chairman: J.F. Burks, Professor of French; A-11, Telephone 676-6330

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

1–2 **First-year Italian** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Ital 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern Italian prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester.

3–4 **Second-year Italian** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Ital 4. Conversation, grammar, composition, reading in modern Italian prose, introduction to Italian civilization. Aural training, oral practice in language laboratory. Prerequisite: Ital 1–2 or two years of high school Italian. Laboratory fee, $17.50 a semester.

Latin American Civilization—Special Program

Program Director: R.C. Burns; Building LL, Telephone 676-7049

Faculty Consultants: C.E. Galbreath, Professor of International Economics; Marvin Gordon, Associate Professor of Geography and Regional Science; J.W. Robb, Professor of Romance Languages; B.M. Sapin, Professor of International Affairs and Political Science; K.L. Storrs, Instructor in Political Science

101 **Latin American Civilization** (3)

A three-week, University-conducted study program in a selected area in Latin America, effecting a broad synthesis of history, politics, economy, geography, language, and literature in order to achieve an understanding of contemporary problems and assess national attitudes in the light of world relations. On-the-spot seminars, guest lectures at universities, instructional visits to government offices, first-hand observation of each

*Administered by the Department of Romance Languages and Literatures.

country and the operation of its economy, comparisons and contras among the countries of the area. May be repeated for credit.

Management Science

Chairman: E.K. Winslow, Associate Professor of Behavioral Sciences; Governmen 201, Telephone 676-7375

118 **Introduction to Data Processing** (3)

Basic principles and methods. A management-oriented introduction to the fundamentals, potentials, and problems of computer-based data processing as a tool for record-keeping, resource-controlling, and decision-making.

119 **Data Processing Programming** (3)

Basic principles and methods. Problem-solving illustrated through analysis, flow charting, and programming of business-oriented data processing problems. Students write programs in FORTRAN and COBOL using the University's IBM 360 computer. Prerequisite: Mgt 118.

120 **Data Processing Systems** (3)

Assessment of the systems concept and its relationship to management, organization, data, and information. Principles and techniques of analysis, design, and implementation of computer-based data and information systems; management of systems planning resources.

201 **Advanced Administrative Management** (3)

Principles and practices common to administrative units of all kinds.

203 **Mathematics for Management** (3)

Mathematical concepts employed in the solution of management problems. Applications of analytical geometry, functions, elements of calculus, and linear algebra to optimization problems. Prerequisite: algebra.

204 **Quantitative Factors in Administration** (3)

Survey of quantitative techniques used in the solution of management problems. Potentials and limitations of mathematical models and proper areas for their application. Topics include probability, statistical decision theory, linear programming, waiting line, inventory replacement models.

207 **Human Behavior in Organizations** (3)

Individual, group, intergroup, and other human behavior and development; application of social science research to administration. Practical applications emphasized.

218 **Survey of Data Processing** (3)

A management-oriented presentation of the vocabulary, concepts, and trends in computer hardware and software, information systems design and development, organizational impact, and effective management; milestones of past and current research; computer technology as a rapidly evolving force of major significance in business, government, and industry. Designed to provide comprehension of information technology nec-

essary for contribution to an organizational data processing effort or as preparation for more advanced study.

219 **Digital Computer Programming Concepts** (3)

Programming concepts, techniques, and practices as applied to third generation computers. Fundamentals of higher-level languages, flow charting, FORTRAN, COBOL, operating systems, and utility programs. Student programs are run on the University Computer Center's IBM 360 computer. This course will provide the student with an understanding of the role of computer programming in management information systems and management research. Prerequisite: Mgt 218 or permission of instructor.

220 **Comparative Digital Computer Systems and Their Management** (3)

Characteristics and capacities of the range of data processing equipment in use today, special purpose equipment in business and government, recent and prospective equipment developments, and selection of computers and related equipment. Prerequisite: Mgt 218 or permission of instructor.

221 **Management Information Systems Development and Application** (3)

Development of management information systems, integration of data processing in operations of government or business, impact on management organization and decision-making. Case studies. Prerequisite: Mgt 218 or 219, or permission of instructor.

222 **Seminar: Advanced Digital Computer Concepts** (3)

Current problems in the design and implementation of computer-based systems; emphasis on current state-of-the-art through discussion with leading experts in the field and analysis of literature. Admission by permission of instructor.

223 **Management of a Data Processing Organization** (3)

Advanced course in information technology; emphasis on principles, practices, and trends in the management of data processing. Unique problems, functions, and requirements of data processing management, stressing executive interaction in decision-making, planning, and evaluative functions. Prerequisite: Mgt 218 and either 219 or 220; or permission of instructor.

224 **Theory and Management of Systems** (3)

Introduction to systems theory and qualitative systems analysis. Analysis of systems in organizations and their impact on management: systems point of view, enterprise as a system, effect of technical and management systems on organization structure, information-decision systems, systems design, and dynamic aspects of organizational systems. Prerequisite: Mgt 201, 204 or 225, 207.

225 **Introduction to Managerial Statistics** (3)

The mathematics of probability and statistics and its applications in management science and operations research. Topics include random variables, discrete and continuous probability distributions; moments and other descriptive measures; sampling theory; and an introduction to statistical estimation, hypothesis testing, and regression analysis. Prerequisite: Mgt 203 or equivalent.

226 **Managerial Statistics** (3)

Management applications of the theory and techniques of mathematical statistics. Topics include maximum likelihood and other methods of estimation, hypothesis testing, descriptive measures of bivariate distributions, regression and correlation, analysis of time series, econometric models and multiple regression, statistical decision theory, and the revision of probabilities in decision-making. Prerequisite: Mgt 225.

227 **Mathematical Programming: Techniques and Applications** (3)

Technical and management considerations of linear and nonlinear programming. Mathematical and computational aspects of linear programming. Formulation of linear programming models. Studies of applications of linear programming. Introduction to theory and application of nonlinear programming. Prerequisite: Mgt 203 or equivalent.

228 **Systems Analysis by Simulation** (3)

Survey and introduction to contemporary operations research techniques. Analytical methods such as simulation, queuing, Markov chains, dynamic programming, game theory, and network flows. Prerequisite: Mgt 225, 227.

229 **Seminar: Management Science and Operations Research** (3)

Supervised study in depth and advanced projects in management science and operations research. Prerequisite: Mgt 226, 227; or permission of instructor.

230 **Administration of Research and Development** (3)

Examination of technological, political, and economic factors affecting the R&D environment; operational aspects; management problems in military, governmental, and industrial organizations; project selection, resource allocation, personnel, planning and control, measurement and evaluation.

*280–81
–82 **Managerial Aspects of National Security** (3 or 4–3 or 4–3)

The application of business management principles to the military aspects of national security; organization and administration of the federal government for national defense; management of national resources (natural, human, energy, economic); budgeting and controllership; determination of requirements; procurement; production; supply management; and communications.

295 **Research Methods** (3)

Research techniques, sources of information, array and analysis of data, interpretation and presentation of the findings.

Mathematics

Chairman: T.P.G. Liverman, Professor of Mathematics; Monroe 422, Telephone 676-6235

No Mathematics courses numbered 1 to 100 are available for college credit if the student's previous training in mathematics meets the prerequisite for a higher numbered course.

* Available only to students in the Master of Science in Administration program at the Industrial College of the Armed Forces.

Graduate credit may not be given for Mathematics courses numbered from 101 to 200 without the permission of the Chairman of the Department.

3 **College Algebra** (3)

Equivalent to the standard two years of high school algebra with several additional topics. Prerequisite: one year each of high school algebra and high school geometry.

6 **Plane Trigonometry** (3)

Prerequisite: two years of high school algebra and one year of high school geometry, or Math 3 (or concurrent registration therefor).

9 **General Mathematics I** (3)

For students electing Math 9 and 10 as a terminal sequence. Logic, sets, number systems. Prerequisite: two years of high school mathematics.

10 **General Mathematics II** (3)

Mathematical systems, geometry, and introduction to statistics and probability. Prerequisite: Math 9.

30 **Precalculus** (3)

Set theory, inequalities, basic analytic geometry, functions and relations. Polynominal, trigonometric, logarithmic, and exponential functions. Prerequisite: Math 3 and 6; or one and one-half years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry; or equivalent. Prior to registration, new students should take a placement examination in algebra and trigonometry.

31 **Calculus of One Variable** (3)

Differentiation and integration of algebraic and elementary transcendental functions, with simple applications. Prerequisite: Math 30 or equivalent. Math 30 may be waived as a prerequisite by examination on scheduled dates.

32 **Calculus of Several Variables** (3)

Partial derivatives, multiple integrals, infinite series. Prerequisite: Math 31.

33 **Calculus of Vector Functions** (3)

Elementary linear algebra, vectors, and matrices. Vector calculus, implicit function theorem. Prerequisite: Math 32.

34 **Introduction to Linear Algebra** (3)

Linear functions, solutions of equations, dimension and rank, determinants, eigenvalues, change of basis. Prerequisite: Math 31 or permission of instructor.

111 **Mathematics for Engineers and Physicists I** (3)

Differential equations, linear and multilinear algebra. Laplace transform. Prerequisite: Math 33, 34; or permission of instructor.

112 **Mathematics for Engineers and Physicists II** (3)

Fourier integral, Fourier series, partial differential equations. Prerequisite: Math 111.

124 **Introduction to Matrix Theory** (3)
Operations on matrices, linear equations, matrix inversion, vector spaces, characteristic roots and vectors, spectral theorem, quadratic forms. Prerequisite: Math 32, 34.

134 **Introduction to Boundary Value Problems** (3)
Prerequisite: Math 111 or 142.

139 **Advanced Calculus I** (3)
Review and extension of elementary one-variable calculus, emphasis on the theoretical foundations; differential calculus of several variables. Prerequisite: Math 33.

140 **Advanced Calculus II** (3)
Differential and integral calculus of several variables; implicit function theorem; differential forms. Prerequisite: Math 139 or equivalent.

153 **Introduction to Numerical Analysis** (3)
Introduction to fundamentals of numerical analysis using modern digital computers. Solution of linear systems and of ordinary differential equations. Interpolation polynomials. Iterative solution of nonlinear equations. Simple quadrature techniques. Prerequisite: Math 111 or 139, or equivalent.

*160 **Introduction to Abstract Algebra for Teachers** (3)
Basic algebraic structures, such as groups, rings, integral domains, and fields; properties of integers and rational numbers. Prerequisite: Math 31 or equivalent.

*161 **Introduction to Linear Algebra for Teachers** (3)
Linear functions, solution of equations, quadratic forms, change of basis. Prerequisite: Math 31 or equivalent.

*164 **Foundations of Mathematics for Teachers** (3)
Logic, set-theory, and foundations of the real number system. Prerequisite: Math 31 or equivalent.

171 **Vector Analysis** (3)

Microbiology

Acting Chairman: L.F. Affronti, Professor of Microbiology; School of Medicine. Telephone 331-6531

†237 **Dental Immunology** (1)
Fundamental immunologic concepts. Emphasis on serologic, biochemical, and immunologic procedures as applied to clinical and research situations.

†238 **Advanced Dental Immunology** (1)
Advanced immunologic concepts related to physiological and biochemical bases of dental disease. Prerequisite: Micr 237.

* Open only to candidates for the degree of Master of Science for Teachers, teachers for in-service training, or students recommended by the Department of Education.
† Open only to students in the program of study leading to the degree of Master of Science in Special Studies with a concentration in Oral Biology.

Music

Chairman: George Steiner, Professor of Music; FF–10, Telephone 676-6245

3 Introduction to Musical Understanding (3)

Introductory history of musical styles, related to listening; elements and materials of music.

4 Survey of Music Literature (3)

Introductory study of musical forms, structures, and textures; aural analysis of selected literature.

Oceanography*

Program Adviser: Hyman Orlin, Professorial Lecturer in Geodetic and Cartographic Science; Telephone 946-3557

11 Navigation (3)

Theory of navigation, charts, navigation aids, celestial navigation, shipboard instruments.

101–2 Elementary Oceanography (3–3)

Chemical and physical properties and composition of sea water, heat budget, distribution of variables, statics, dynamics, water masses, general circulation of the oceans, underwater sound, propagation of light, submarine topography, sea floor deposits, biological classifications, and marine ecology. Spectrum of ocean waves from capillary through tidal, including internal waves. Observations and reduction; history and interrelationships between marine sciences. Prerequisite to Ocea 102: Geol 1 or 3, or permission of instructor.

110 Physical Oceanography (3)
(Formerly Ocean Dynamics)

All aspects of physical oceanography except waves and tides. Subjects of physical and chemical properties of sea water, underwater sound, and propagation of light. Emphasis on hydrodynamic equations, statics and kinematics, currents, heat budget, turbulence, and the general circulation and water masses of oceans. Prerequisite: Math 32, Ocea 101; or permission of instructor.

111 Ocean Waves and Tides (3)

All aspects of waves and tides; survey of tidal theory and analysis. Prerequisite: Math 32, Ocea 101.

112 Biological Oceanography (3)

Biological science as related to marine environment. Prerequisite: Ocea 102.

113 Marine Geophysics (3)

Principles of geophysical measurements and interpretation, earthquake seismology, sound propagation, seismic refraction, and reflection at sea. Selected reflection and refraction studies offshore; geophysical investigations

*Affiliated with the Department of Geography and Regional Science.

of some selected trenches. Prerequisite: Geop 105, Phys 1; or permission of instructor.

114 **Chemical Oceanography** (3)

Chemical processes in the marine environment, including composition of sea water, nutrients, natural composition and variation, carbonate cycle, geochemistry, and extraction. Prerequisite: Chem 12, Ocea 101; or permission of instructor.

115 **Geological Oceanography** (3)

Physiography of the sea floor and geological processes of the ocean basins and margins, properties and distribution of sediments and rates of deposition; distribution of minerals, structure and origin of the ocean basins. Prerequisite: Ocea 102.

Oral Biology

Program Adviser: E.A. Caress, Assistant Dean of the Graduate School of Arts and Sciences; Bacon 201, Telephone 676-6210

The courses listed below are open only to students in the program of study leading to the degree of Master of Science in Special Studies with a concentration in Oral Biology. This degree program is offered by the Graduate School of Arts and Sciences in cooperation with the Naval Dental School at the National Naval Medical Center, Bethesda, Md. (see page 68).

201 **Research Methodology** (0)

202 **Oral Pathology** (3)

203 **Diagnosis** (3)

204 **Patient Management** (3)

205 **Topographic Anatomy of the Head and Neck and Anatomy of Medical Emergencies** (2)

206 **Hospital Dentistry** (1)

208 **Naval Administrative Management** (1)

209 **Seminar: Surgical Oral Pathology Conference** (3 or 4)

210 **Seminar: Clinicopathology Conference** (3 or 4)

230 **Specialty Clinic—Oral Medicine** (3)

222 **Advanced Clinical Dentistry** (3)

226 **Advanced Clinical Dentistry** (3)

230 **Special Clinic—Oral Medicine** (3)

232 **Specialty Clinic—Periodontics** (3)

234 **Specialty Clinic—Endodontics** (3)

236 **Specialty Clinic—Prosthodontics** (3)

238 **Specialty Clinic I—Oral Surgery** (3)

239 **Specialty Clinic II—Oral Surgery** (3)

240 **Specialty Clinic—Advanced Oral Pathology** (6)

242 **Seminar: Periodontics** (3)

244 **Seminar: Endodontics** (3)

246 **Seminar: Prosthodontics** (3)

248 **Seminar: Oral Surgery** (3)

250 **Seminar: Special Pathology** (3)

252 **Seminar: Restorative Dentistry** (3)

254 **Seminar: Oral Medicine** (3)

295–96 **Research** (3–3)

harmacology

airman: H.G. Mandel, Professor of Pharmacology; School of Medicine, Tele-one 331-6541

21–22 **Chemistry and Physics of Anesthesia** (3–3)

Fundamental concepts of physics, general and organic chemistry, and biochemistry and their application to medicine and anesthesiology, including chemistry of respiration, acid-base balance, clinical biochemistry and enzymology, hormones, radioisotopes, electronics, physicochemical properties of anesthetic agents, and other related topics.

110 **Pharmacological Basis of Anesthesia** (3)
(Formerly Pharmacology of Anesthesia)

Fundamental principles of pharmacology; drugs affecting the autonomic nervous system, central nervous system, and cardiovascular system; fundamentals of inhalation anesthesia; auxiliary drugs used in anesthesiology; other topics.

115 **Drug Abuse Education** (3)

Psychological and sociological bases of drug abuse, pharmacological and toxicological aspects of drug action on both the brain and peripheral organ systems, legal and societal implications of and reactions to drug abuse. Lectures and discussions on alcohol, narcotics, central nervous sys-

tem stimulants and depressants, marijuana and other hallucinogenic and psychedelic drugs.

215 **Adolescent Drug Abuse: a Program for Educators** (3)

Primarily for secondary school teachers, counselors, and administrators. Multidisciplinary lectures and discussions concerning the physiological and psychological effects of narcotics, central nervous system stimulants and depressants, alcohol, and hallucinogenic and psychedelic drugs; psychosocial factors leading to adolescent drug abuse; legal implications of drug abuse; prevention, control, and treatment of drug abuse.

251 **Pharmacological Basis of Oral Therapeutics** (3)

Lectures and discussions on the clinical pharmacology of drugs used in the practice of dentistry; drug interactions; adverse reactions affecting the oral cavity.

Philosophy

Chairman: Thelma Z. Lavine, Elton Professor of Philosophy; Rice 611, Telephone 676-6266

50 **Introduction to Philosophy** (3)

(Replaces former Phil 61–62 Introduction to Philosophy (3–3))

Readings from major philosophers and of philosophic positions from Plato to the present.

Physical Education, Health, and Recreation

Chairman: J.L. Breen, Professor of Physical Education; K-20, Telephone 676-6280

101 **Physical Education in the Elementary School** (3)

For Elementary Education and Physical Education majors. Child growth and development related to school and playground programs in movement. Philosophy, curriculum, techniques of teaching, and equipment evaluation.

163 **Basic Simulation—Driver Education** (3)

(Formerly PE 263)

Orientation and psychological foundations of simulator instruction. Operation, care, and preventive maintenance; organization and administration of a driver education simulator program.

165 **Driver and Safety Education II** (3)

(Formerly PE 265 Driver and Safety Education III)

Modern methods and materials in traffic safety and driver education; psychological testing; Drivucator; multiple car method.

202 **Conceptual Basis of Motor Learning** (3)

(Formerly Motor Learning)

Theories of learning and application to development of motor skills; motor theories of perceptual and conceptual learning.

220 **Problems in Health Education** (3)

Lecture (2 hours), conference (1 hour). Health needs, policies and program planning, use of community resources, promising practices in the field.

250 **Administration of Urban Leisure Services** (3)
(Formerly Recreation and Outdoor Education)

Planning and organization of a comprehensive system of urban leisure services utilizing educational, cultural, and recreational resources, emphasis on public relations, personnel administration and supervision, systems analysis, fiscal management and managerial accountability.

Physics

Chairman: Julian Eisenstein, Professor of Physics; Corcoran 102, Telephone 676-6275

Departmental prerequisite: Phys 31–32 or equivalent, and consent of a departmental adviser, are prerequisite to all courses in Physics numbered from 101 to 200.

ASTRONOMY

9–10 **Introduction to Astronomy** (3–3) (Campus Course)

Lecture (2 hours), recitation (1 hour), laboratory (2 hours). Classical through modern astronomy with introduction to basic principles underlying astronomical systems and observations. Primarily for nonscience majors. Laboratory fee, $11 a semester.

PHYSICS

1 **General Physics** (4) (Campus Course)

Topics in classical physics which form a foundation for modern physics. Prerequisite: two years of college preparatory mathematics or concurrent registration for Math 6. Laboratory fee, $11.

2 **Introduction to Modern Physics** (4) (Campus Course)

Selected topics in modern physics, including relativity and quantum theory. Prerequisite: Phys 1 or equivalent. Laboratory fee, $11.

Political Science

Chairman: H.L. LeBlanc, Professor of Political Science and Public Affairs; C–619, Telephone 676-6290

Departmental prerequisite: P Sc 4 and 6 or 5 and 6 are prerequisite to courses in Political Science numbered from 101 to 200.

4 **Introduction to Political Science** (3) (Campus Course)

Introduction to the study of comparative political systems; emphasis on contemporary concepts and techniques used to examine politics and government. Students who receive credit for P Sc 4 cannot receive credit for P Sc 5.

5 **Introduction to Political Science** (3)

Introduction to the study of comparative political systems: emphasis on structures and processes of major foreign governments and the force of basic ideologies. Students who receive credit for P Sc 5 cannot receive credit for P Sc 4.

6 **Introduction to Political Science** (3)

Introduction to the study of the structure, powers, and processes of the American political system.

103 **State Politics** (3)

(This course, together with P Sc 104, replaces former P Sc 103–4 State and Local Governments)

Theory and practice of American federalism, factors influencing state policy choices, state responsiveness to urban problems.

104 **Urban Politics** (3)

(This course, together with P Sc 103, replaces former P Sc 103–4 State and Local Governments)

Demographic trends and implications, local metropolitan political systems, issues in urban politics, strategies of political change.

111 **Comparative Government and Politics** (3)

Government and politics of the principal constitutional democracies of Western Europe.

*112 **Comparative Government and Politics** (3)

Introduction to the government and politics of the communist nations; emphasis on the Soviet Union and the countries of Eastern Europe.

117–18 **Political Theory: Nature and Growth of Western Political Thought** (3–3)

P Sc 117: foundations of Western political thought, classical to medieval. P Sc 118: Renaissance to recent times. Philosophical roots of modern political order and disorder.

121–22 **U.S. Constitutional Law and Politics** (3–3)

P Sc 121: separation of powers, federal-state relationships, economic regulation. P Sc 122: political and civil rights. Prerequisite: junior status.

125 **Legislative Process** (3)

(Formerly The American Congress)

Study of Congress and the state legislatures, including legislative power structure, selection of legislators and the roles they play, decision-making, and the relationship between the legislative and executive branches.

126 **The American Presidency** (3)

Development of the institution, selection process, role of the Presidency in policy-making.

145 **U.S. Political Parties and Politics** (3)

Party system and structure, role of ideology, voting behavior, campaigns and elections, devices for organizing the government.

* P Sc 112, 115, and 161 are related in their subject matter, and credit for only one of the three may be applied toward a degree.

151 **Public Administration and Public Policy-making** (3)
(Formerly Public Administration)
Examination of the process by which the federal government selects and implements public policies. Particular attention to the role of bureaucracies in the policy-making process. Criteria for the evaluation of public policy.

167 **U.S. Foreign Policy** (3)
Constitutional and political factors that determine the formulation, execution, and substance of U.S. foreign policy.

171 **International Politics** (3)
International actors, international and domestic environments of foreign policy, global and regional patterns, general characteristics of foreign policy.

172 **International Organizations** (3)
Development and operations of the United Nations, regional organizations, and functional international organizations.

181–82 **Public International Law and Organization** (3–3)
Survey of the public law of nations. P Sc 181: emphasis on the law of peace. P Sc 182: continuation of the law of peace; attention to neutrality and the so-called law of war.

190 **Politics of Middle and Southern Africa** (3)
Comparative analysis of the political systems of selected countries of non-Mediterranean Africa.

191 **Governments and Politics of the Middle East** (3)
Domestic and international politics of the eastern Arab states, Turkey, Iran, and Israel.

192 **Governments and Politics of North Africa** (3)
Domestic and international politics of Algeria, Tunisia, Morocco, Libya, Egypt, Sudan; their relations with states of the Middle East.

193 **Governments and Politics of South and Southeast Asia** (3)
Domestic and international politics of the major states in the area.

194 **Governments of China and Japan** (3)
Institutions and processes of the government in contemporary China and Japan, with some historical background. Attention to ideological forces. Students who receive credit for P Sc 194 cannot receive credit for P Sc 162.

209 **Presidential-Congressional Relations** (3)
(Formerly Seminar: the American Presidency)
Examination of the patterns of interaction between the executive and legislative branches; emphasis on policy-making roles and structures.

211–12 **Comparative Government and Politics** (3–3)
Problems of comparative political analysis; a comprehensive examination of the literature in comparative politics.

222 **Judicial Policy-making and Civil Liberties** (3)
(Replaces the second-half of P Sc 221–22, The United States Constitution and the Judicial Function (3–3))
Examination of the role of the judiciary in policy formulation; emphasis on the U.S. Supreme Court and civil liberties issues.

240 **Legislative Theory and Behavior I** (3)
Introduction to the study of legislative theory and behavior, state and national; emphasis on legislative recruitment, constituency-representative relations, policy-making, and communication.

241 **Legislative Theory and Behavior II** (3)
Reading and research on selected aspects of legislative theory and behavior with particular reference to the U.S. House of Representatives and Senate.

242 **Legislative Affairs** (3)
The process of empirical research: construction of research design, data collection, and analysis. Techniques discussed will include content analysis, survey research, and analysis of institutional voting.

243 **Comparative Legislative Systems** (3)
Critical review of major works on the legislatures of selected European and Asian political systems.

244 **Public Policy Analysis** (3)
Reading and research in systematic methods of public policy analysis.

267 **Seminar: U.S. Foreign Policy** (3)
Research and selected reading as the basis for an analysis of the foreign policy of the United States, with particular reference to the decision-making process and the execution of policy.

Psychology

Chairman: J.N. Mosél, Professor of Psychology; GG-211, Telephone 676-6320

Departmental prerequisite: Psyc 1 or 5 or 6 is prerequisite to all other courses in Psychology. Six semester hours in Psychology courses are prerequisite to Psychology courses numbered above 100.

1 **General Psychology** (3)
Fundamental principles underlying human behavior.

8 **Psychology of Motivation and Personality** (3)
Introduction to the psychology of personality. Principles of motivation, personality development, social and cultural factors, assessment and description of personality emphasized.

22 **Introduction to Educational Psychology** (3)
The contributions of psychology to education; emphasis on learning.

29 **Psychology of Childhood** (3)
Developmental approach to study of the child. Emphasis on the socialization process, learning, and the child's view of the world.

101 **Abnormal Psychology** (3)

Causes, diagnosis, treatment, and prevention of various types of maladjustments and mental disorders. Prerequisite: 6 semester hours in psychology, or 3 in psychology and 6 in a biological science.

112 **Psychology of Adolescence** (3)

Psychological characteristics and problems peculiar to adolescence, with emphasis on applications of psychology to solution of such problems.

121 **Psychology of Learning** (3)

Theories and issues related to basic learning processes as determinants of behavior. Emphasis on current research using both human and animal subjects.

129 **Theories of Personality** (3)

Survey of personality theories; emphasis on their application to problems of individuals.

131 **Psychological Tests** (3)

Survey of psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee, $7.

144 **Personnel and Industrial Psychology** (3)

Psychological concepts and methods applied to problems of personnel management, human engineering, employee motivation, and productivity.

145 **Psychology of Management** (3)

Psychological aspects of managing work organizations. Departmental prerequisite waived.

151 **Social Psychology** (3)

Social foundations of attitudes and behavior: cognition, motivation, role-behavior, communication, small-group processes, racial attitudes, nationalism, and war.

156 **Psychology of Attitudes and Public Opinion** (3)

Psychology of opinion formation, measurement of opinion, social determinants of attitudes, psychological processes in propaganda, bases of receptivity to propaganda, psychological warfare.

Public Administration

Chairman: D.R. Cloutier, Professor of Public Administration; Government 302, Telephone 676-6295

213 **Administration in Government** (3)

Critical analysis of federal administrative organizations as an integral part of the political system. Roles of Congress, the President, the courts, interest groups, political parties, and the public in the administrative process; special attention to centripetal and centrifugal forces.

215 **Comparative Administrative Systems** (3)

Examination and analysis of the administrative systems of selected foreign

governments; attention to practices applicable to administration in the United States.

218 **Seminar: Developmental Administration II** (3)

Problem of the transfer of administrative capability from one country to another. Political and administrative development. Unilateral and multilateral approaches. The role of the innovator. Strategies of administrative development.

221 **Management in the Executive Branch** (3)

Analysis of application of management theory and practice in the executive branch of the federal government; emphasis on staff responsibilities and relationships and internal organization and control.

223 **Behavioral Factors in Large Organizations** (3)

Analysis of the nature and characteristics of bureaucracy; dysfunctionalism; approaches to policy guidance and leadership, particularly in large public organizations; influence and control systems.

231 **Public Personnel Administration** (3)

Survey of basic principles and functions of personnel administration in the public service. Roles of personnel management, recruitment, placement, wage and salary administration, training, retirement, and other personnel functions.

232 **Problems in Public Personnel Management** (3)

Analysis and evaluation of major personnel management problems in government; employee-management relations; interagency and intergovernmental relationships. Impact of automation. Evaluation of personnel systems.

233 **Seminar: Manpower Development and Utilization** (3)

Analysis of manpower resources. Research projects and case studies in ways and means of increasing employee potential; use of training programs, executive development, incentive systems.

235 **Technological Change and Manpower** (3)

Research, discussion, and readings dealing with manpower problems arising from automation and other technological changes. Evaluation of these developments in government and business; their implications for productivity, employment, training and education, and personnel and industrial relations. Analysis of economic, political, and social factors influencing public and private industry manpower policies.

246 **Urban Dynamics and Citizen Participation in Administration** (3)

Exploration of the nature, costs, and benefits of citizen participation in administration of metropolitan area programs. Focus on tools of citizen participation, their impact on federal policy and reorganization of urban government, and the effect of decentralization on citizen participation.

248 **Financing Metropolitan Services** (3)

Analysis of the structure and administration of public finance of local governments.

249 **Administration in Metropolitan Area Governments I** (3)

Public administration in metropolitan areas. An ecological approach to understanding the interrelationship between the management of urban programs and economic, social, and political factors that affect the urban environment.

250 **Administration in Metropolitan Area Governments II** (3)

Application of policy analysis in metropolitan administration, including the consideration of specific federal, state, and local programs in metropolitan areas.

251 **Governmental Budgeting** (3)

Survey of the basic concepts, principles, and practices in governmental budgeting; interrelationship of planning, programming, and budgeting; their role in the management process.

252 **Problems in Planning, Programming, and Budgeting** (3)

Intensive analysis of developments in federal planning, programming, and budgeting; application of new tools in the decision-making process; evaluation of the systems.

254 **Seminar: Financial Management in the Federal Service** (3)

Functions and interrelationships of central federal financial management agencies, their policy, economic and managerial roles, controllership functions, and standards and practices in financial management.

260 **Seminar: Policy Formulation and Administration** (3)

Analysis in depth of factors and processes involved in policy development, with particular attention to selected areas of national policy; development of agency goals and objectives.

262 **Seminar: Science, Technology, and Public Policy** (3)

The impact of science and technology upon public administration in terms of both administrative practice and national policies.

299 **Thesis Seminar** (3) (Campus Course)

Examination of thesis standards, research philosophy and methodology.

300 **Thesis Research** (3)

eligion

hairman: R.G. Jones, Professor of Religion; O-12, Telephone 676-6325

9 **The Old Testament** (3)

Historical and literary study of the Old Testament with consideration of development of religious ideas, institutions, and outstanding personalities.

10 **The New Testament** (3)

Study of New Testament literature from the standpoint of occasion, purpose, dominant ideas, and permanent values. Emphasis on approach, structure, and significance of the Gospels and Epistles.

21 **Introduction to Religious Thought** (3)

Traditional religious concepts, language of contemporary religion amidst modern scientific and secular intellectual tendencies, and the place of religion in today's society.

59–60 **History of Religions** (3–3)

Origins, evolution, and contemporary status in historical context. Rel 59: primitive religion and the religions of the East (Hinduism, Buddhism, Taoism, Confucianism, Shinto). Rel 60: religions of the West and Near East (ancient religions, Judaism, Christianity, Islam).

127 **Medicine, Religion, and Healing** (1) (Campus Course)

Total care concept. Importance of religion in medical practice for patient and physician. Concept of the professional man, the clergy's role in healing, religious perspective on issues in medical ethics.

216 **Supervised Clinical Pastoral Education** (I-A) (6)

Full-time program of clinical pastoral education in an approved center. Involvement in the responsibility for pastoral ministry is reviewed and evaluated in a peer-group context.

217 **Supervised Clinical Pastoral Education** (I-B) (6)

A continuation of Rel 216 with emphasis on pastoral and personal identity, sustained pastoral relationships, and pastoral methods and skills.

218 **Supervised Clinical Pastoral Education** (III-A) (6)

Responsibility in pastoral ministry is increased with emphasis on group work, interprofessional involvement, use of specific counseling methods, work with persons with special problems. Prerequisite: Rel 216 and 217 or equivalent.

219 **Supervised Clinical Pastoral Education** (III-B) (6)

Continuation of Rel 218 with emphasis on the examination and review of administrative procedures, designing pastoral programs, and developing a pastoral theology.

222 **Seminar: Christian Ethics** (3) (Campus Course)

Important tendencies in ethical reflection of the contemporary Christian Church; contributions of social sciences to that reflection.

225 **The Dynamics of Ministering to the Young Adult** (3)

Conceptual models of development of young adults from late adolescence: special problems of educational and military experience, vocational choice, marriage and the family, and physical, intellectual, emotional, and religious development. Encounter experience with persons and groups.

227–28 **Advanced Studies in Pastoral Care** (3–3)

History and present state of methodologies and conceptual models of pastoral counseling and leadership in groups; supervised work in interfaith and multidisciplinary ministries.

232 **Seminar: Christianity since 1500** (3) (Campus Course)

Selected topics.

235 **Seminar: Roman Catholicism in the Modern World** (3) (Campus Course)

Important leaders and their ideas in selected developments since 1500—doctrinal, spiritual, biblical, liturgical, and ecumenical.

237 **Seminar: Theological Analysis** (3) (Campus Course)

Historical and topical study of the development of important ideas in such areas as Christology, soteriology, and ecclesiology.

299–300 **Thesis Research** (3–3) (Campus Course)

Slavic Languages and Literatures

Chairman: C.A. Moser, Associate Professor of Russian; 522 21st St., 1st floor, Telephone 676-6335

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

1–2 **First-year Russian** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Slav 2. Beginners' course in fundamentals of grammar and pronunciation. Laboratory fee, $17.50 a semester.

3–4 **Second-year Russian** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Slav 4. Prerequisite: Slav 1–2 or two years of high school Russian. Laboratory fee, $17.50 a semester.

9–10 **Russian Conversation and Composition** (3–3) (Campus Course)

Listening comprehension; oral and written practice. Prerequisite: Slav 4 or 6, or permission of instructor.

91–92 **Introduction to Russian Literature** (3–3)

Survey of Russian literature, in translation, from earliest periods through literary masterpieces of the 19th and 20th centuries. Term paper required.

109–10 **Advanced Russian Conversation and Composition** (3–3)

Developing proficiency in oral and written expression. Prerequisite: Slav 10 or equivalent.

161–62 **Russian Culture** (3–3)

Survey of Russian cultural heritage from origins of ancient Russia to present—in English. Lecture, recitation, discussion, and individual reports on assigned topics.

165 **Soviet Literature from the Revolution to World War II** (3)

Basic themes, issues, literary figures of the Soviet 1920's. The fate of literature and writers under increasing state control; Five-year Plan literature. Lecture, discussion, reports—in English.

166 **Soviet Literature from World War II to the Present** (3)

Literature in wartime, under Stalinism, and in the "thaws." The new gen-

eration of dissident liberals and "underground" literature. Lecture, d cussion, reports—in English.

193–94 **The Other Slavs: Their Literature—in English** (3–3)
(Formerly Introduction to Slavic (non-Russian) Literature—in English)
An examination of non-Russian Slavic literatures from their beginnin to the present day. Emphasis on themes, ideas, and styles peculiar to ea literature.

Sociology

Chairman: R.G. Brown, Professor of Sociology; D-201, Telephone 676-6346

Departmental prerequisite: Soc 1 is prerequisite to all other courses in Sociolog

1 **Introductory Sociology** (3)
General principles of sociology; development of culture and personality impact of groups and institutions on man's social behavior. Survey o fields within sociology.

2 **American Social Problems** (3)
(Formerly Introductory Sociology)
Analysis of major social problems confronting the United States; factor producing social problems, their nature and treatment.

61 **Development of Social Thought** (3)
Examination of concepts and theories relevant to the nature of society an human relationships from ancient writings to the 20th century. Prerequi site: Soc 1.

124 **Medical Sociology** (3)
Social factors and processes related to the etiology and treatment of physical and mental illness; medical occupations and professions, medica organizations, problems of delivery of health care services.

126 **Urban Sociology** (3)
Place of the city in larger society; growth of the city, problems of urban living, group life, personality, urban housing, city planning, and suburba development.

127 **Population Problems** (3)
Composition of populations, trends in population growth and population pressure, factors producing population movements, effects of migration, population policies—eugenics and birth control.

129 **Race and Minority Groups** (3)
Analysis of relationships between dominant and minority groups in society particularly in the United States; nature and range of problems; analysis of the phenomenon of prejudice.

130 **Social Stratification** (3)
Analysis of distribution of resources and opportunities for participation education, and social mobility in American society; international compar son; analysis of public policies which affect these distributions.

133 **Sociology of Education** (3)

Analysis of educational systems from institutional perspectives and as agencies of socialization; relationships of education in general to society, including technological, communal, and subcultural components.

134 **Marriage and the Family** (3)

Courtship as a social process, marriage and marital adjustment, development of the family, parent-child relations, family problems, disorganization, divorce, and family reorganization.

135 **Juvenile Delinquency** (3)

Factors producing delinquency, juvenile detention, the juvenile court, training schools, treatment of offenders.

136 **Criminology** (3)

Nature and distribution of crime as related to the development and operation of criminal law and various social and legal institutions in urban society.

138 **Social Disorganization** (3)

Analysis of factors contributing to disruption of social groups, institutions, and communities; study of attempts to establish social controls to prevent, minimize, or mitigate the effects of socially disruptive conditions and events.

139 **Society and the Deviant** (3)

Analysis of relationships of society, socialization, and deviancy. Social responses to deviancy and criminal offenders; rehabilitative programs in community, courts, and schools.

141 **Social Research Methods** (3)

Introduction to scientific method in the development of social theory and the solution to social problems. Prerequisite: Stat 53 or 104.

149 **Modern Sociological Theory** (3)

Systematic study of contemporary schools of sociological theory, both European and American development; evaluation of scientific contributions of each school. Prerequisite: Soc 61.

210 **Theoretical Foundations of Political Sociology** (3)

Study of sociological perspectives on political processes; emphasis on concepts of power and authority, leadership, alienation, ideology, political socialization, and political change.

228 **Seminar: Urban Social Problems** (3)

Spanish*

Chairman: J.F. Burks, Professor of French; A-11, Telephone 676-6330

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must

* Administered by the Department of Romance Languages and Literatures.

take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course.

1–2 **First-year Spanish** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Span 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern Spanish prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a semester.

3–4 **Second-year Spanish** (3–3) (Campus Course)

A year course: credit toward a degree at this University given on completion of Span 4. Conversation, grammar, composition, reading of modern Spanish prose, introduction to Hispanic civilization. Aural training, oral practice in language laboratory. Prerequisite: Span 1–2 or two years of high school Spanish. Laboratory fee, $17.50 a semester.

Special Education

Chairman: Perry Botwin, Professor of Special Education; C-429, Telephone 676-6170

170 **Interpersonal/Intrapersonal Relationships for Teachers** (3)

Consideration of factors leading to successful interaction with children.

200 **Understanding Young Exceptional Children** (3)

Lecture and field experience. Basic concepts of early child development as applied to special education.

201 **Introduction to Special Education** (3)

Survey course to acquaint prospective teachers with special education and to help them become aware of the various educational modifications necessary to accommodate children in a school program.

204 **Problems in Urban Education** (3)

Problems and issues in urban education; emphasis on factors affecting successful educational practice in low-income areas. Admission by permission of instructor.

240 **Educational Programming for Children with Behavioral Problems** (3)

Analysis of educational provisions for children with behavioral problems through study of ecological considerations in the light of contemporary special education theory.

241 **Preprofessional Internship: Children with Behavioral Problems** (6)

Practicum experience early in the training sequence, consisting of observation of, and interaction with, children with behavioral problems. Under the direction of qualified teachers in a field setting. A minimum of 280 clock hours required.

242 **Clinical Teaching of Children with Behavioral Problems** (3)

Lectures and discussions exploring various psychoeducational techniques of teaching children and adolescents with behavioral problems.

250 **Specialized Techniques and Materials for Diagnostic-Prescriptive Teachers** (3)

Selected materials and techniques used in diagnostic-prescriptive teaching. Must be taken concurrently with S Ed 252. Admission by permission of instructor.

251 **Psychosocial Factors in Diagnostic-Prescriptive Teaching** (3)

Psychosocial factors significant in the process of diagnostic-prescriptive teaching. Admission by permission of instructor.

252 **Professional Internship for Diagnostic-Prescriptive Teachers** (3 or 6)

Supervised school experience in diagnostic-prescriptive teaching. Must be taken concurrently with S Ed 250. Admission by permission of instructor. A minimum of 280 clock hours required.

253 **The Humanizing Curriculum in Diagnostic-Prescriptive Teaching** (3)

Curriculum concepts and modifications aimed at enhancing the classroom environment for learning and growth. Admission by permission of instructor.

260 **Diagnosis of the Educational Needs of Young Children** (3)

Lecture-demonstration course designed to explore the existing and experimental diagnostic tools to aid in education planning for young children. Admission by permission of instructor.

261 **Special Methods for Teaching Young Children** (3)

Study and laboratory practice in specialized techniques and materials for young children. Students develop and experiment with new methods and materials. Admission by permission of instructor.

262 **Seminar: the Education of Young Exceptional Children** (3)

Weekly seminar dealing with concepts and topics pertinent to the education of young exceptional children. Admission by permission of instructor.

263 **Introduction to the Education of the Severely and Multiply Handicapped** (3)

Survey of the characteristics and learning patterns of children with severe disabilities. Lecture and field experience.

264 **Advanced Study in the Special Education of the Severely and Multiply Handicapped** (3)

Specialized programs, techniques, and methods for teaching children with severe disabilities.

265 **Utilization of Supportive Personnel in Early Educational Programs for Exceptional Children** (3)

Methods and opportunities for the use of para-professionals, volunteers, and parents in the education of young children with special needs.

267 **The Role of the Early Childhood Special Educator** (3)

Examination of the spectrum of roles available in early childhood special education; emphasis on role expectations and psychosocial dynamics of the various settings.

268 **Pre-school Planning for Children with Disabilities** (3)

Lecture and field experiences. Application of learning patterns to the education of children with disabilities.

270 **Adapting the Early Childhood Curriculum to Meet Special Needs** (3)

Review of the basic curriculum areas as they relate to the development of readiness skills in special education.

289 **The Diagnostic Procedure** (3)

Examination of the rationale, techniques, and tools essential to academic and psychosocial assessment. Designed to provide practice as well as familiarity with the diagnostic procedure. Admission by permission of instructor.

291 **Practicum in Teaching Children with Behavioral Problems** (6)

Supervised student teaching in programs for children with behavioral problems. Under the direction of a qualified teacher and the supervision of the University staff. A minimum of 280 clock hours required.

292 **Practicum in Teaching Young Children in Special Education** (6)

Supervised student teaching in special education in classrooms for young children. A minimum of 350 clock hours required.

294 **Practicum in Diagnostic-Prescriptive Teaching** (6)

Supervised field experience in diagnostic-prescriptive teacher programs. Admission by permission of instructor. A minimum of 280 clock hours required.

303 **Administration and Supervision of Special Education** (3)

Philosophy and nature of special education; program organization, administration, and development. Surveying local-level needs; program evaluation and supervision. Admission by permission of instructor.

304 **Recent Research and Trends in Special Education** (3)

Emphasis on research methodology and considerations. The unique problems of doing research in special education. Procedures and sources for obtaining research funding. Admission by permission of instructor.

306 **Counseling Families of Children with Special Needs** (3)

Working with parents and community agencies in meeting the educational and social needs of young children. Admission by permission of instructor.

308 **Instructional Media, Technology, and Education** (3)

Review of technological developments as they affect education and special education, including historical perspective; operating principles of various kinds of hardware, including printing, audiovisual equipment, television, and computers.

342 **Seminar: Crisis/Resource Teaching** (3)

Topics and concepts relevant to an exploration of alternative models in the education of children perceived as having learning/behavior problems. Admission by permission of instructor.

343 **Psychoeducational Diagnosis of Children** (3)

Lecture and laboratory course designed to develop *educational* strategies

for children who present behavior or learning problems in the schools. Admission by permission of instructor.

345 **Public School Consultation and Program Planning** (3)

Mental health consultation models in public schools, in-service training programs for educational personnel, and special programming for children with behavioral problems in the schools.

346 **Special Education Theory and Practice for School Administrators** (3)

Lectures and discussions to familiarize public school administrators and supervisors with contemporary special education theory and practice.

350 **The Diagnostic-Prescriptive Teacher** (3)

Rationale, operational models, techniques, and problems relevant to implementation of diagnostic-prescriptive teacher programs. Admission by permission of instructor.

351 **Seminar for Diagnostic-Prescriptive Teachers** (3)

Current practices in regular and special education as they affect the diagnostic-prescriptive teacher; emphasis on concurrent field experience. Admission by permission of instructor.

370 **Intrapersonal Dynamics in Special Education** (3)

Small group exploration of intrapersonal factors essential to understanding roles and interpersonal techniques in teaching exceptional children. Admission by permission of instructor.

Speech and Drama

Chairman: G.F. Henigan, Professor of Speech; Auditorium 6, Telephone 676-6350

1 **Communicative Speaking and Listening** (3)

Basic theories and principles of speech communication; composition, delivery, and criticisms of speaking in interpersonal, group, and public situations. Recording fee, $2.

11 **Voice and Diction** (3)

Development of naturalness, correctness, and clarity in conversational speech. Analysis and correction of individual speech delivery faults through tapes and weekly performances. Recording fee, $4.

45 **Understanding the Theatre** (3)

The art of the theatre; its literature, aesthetics, and mechanics. Contributions of the playwright, actor, director, and designer examined through lectures, visiting artists, class discussions, and attendance at theatrical performances. Primarily for nonmajors.

91 **Parliamentary Procedure and Group Participation** (3)

Principles and procedures for effective speech communication to function successfully at various levels of responsibility in academic, social, professional, civic, or business organizations. Prerequisite: Sp&D 1 or 11, or permission of instructor.

*111 **Business and Professional Speaking** (3)

Study of the communication process in business and professional speaking; practice in presenting technical reports; selling policies, programs, and services; interviews; conferences; speech in training and supervisory activities. Primarily for nonmajors.

121 **Group Discussion and Conference Leadership** (3)

Process of thinking and problem-solving in committees and small groups; methods of leading discussions and conferences. Prerequisite: Sp&D 1 or permission of instructor.

Statistics

Chairman: Herbert Solomon, Professor of Statistics; C-311. Telephone 676-6356

Departmental prerequisite: One entrance unit in algebra is prerequisite to courses in Statistics numbered below 100.

†51 **Introduction to Business and Economic Statistics** (3) (Campus Course)

Lecture (3 hours), laboratory (1 hour). Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, time series, index numbers. Laboratory fee, $13.

†52 **Mathematics of Finance** (3) (Campus Course)

Interest and discount, annuities, valuation of stocks and bonds, sinking funds, amortization, valuation of depletable assets, depreciation.

101–2 **Basic Principles of Statistical Methods** (3–3)

Variables and attributes, averages and dispersion, elementary principles of sampling, introduction to the making of statistical decisions.

107 **Statistics for Engineers** (3)

Probability models, discrete and continuous distributions, sampling, hypothesis testing and estimation, engineering applications. Prerequisite: differential and integral calculus.

109–10 **Quality Control and Reliability Techniques** (3–3)

Statistical methods and probability models for quality control and reliability applications. Prerequisite: Stat 91 or 107.

111 **Business and Economic Statistics I** (3)

Statistical processes as tools in decision-making in areas of economics and business. Admission by permission of instructor.

112 **Business and Economic Statistics II** (3)

Case work to illustrate quantitative procedures for solution of economic and business problems. Prerequisite: Stat 111 or equivalent.

---

* This course can be adapted to the needs of a specific group.
† Stat 101–2, *Basic Principles of Statistical Methods* (3–3), which is offered off campus, may be substituted.

APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject to change in connection with the establishment of judicial processes. Bulletins and handbooks incorporating any changes will be issued as appropriate.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on October 19, 1968:

Whereas, safety and order are essential preconditions of the learning process, and indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of free speech and freedom of assembly, and to safeguarding the right of lawful protest on campus; and is committed equally to maintaining the peace and safety of the campus, in the knowledge that all rights are in jeopardy when violence and civil disorder prevail over law and reason;

Now, therefore, be it resolved by the Senate of The George Washington University: that in the event a demonstration at this University exceeds the bounds of free assembly and lawful advocacy, and demonstrators are engaging in unlawful acts which cause or imminently threaten injury to persons or property, or which obstruct or interfere with normal and necessary University activities, this body affirms the authority of the President, or other University officials designated to act in his absence, to take such reasonable steps, if possible after consultation with the Chairman of the Executive Committee of the University Senate* and the President of the Student Body, as are required to restore and preserve order; including, if deemed necessary and appropriate, suspension of students or faculty engaging in such acts, and use of such law enforcement personnel as are needed to effect the removal, arrest, and prosecution of law violators. Any such suspension shall be reviewed by an appropriate tribunal as soon after order is restored as is practicably possible.

The following was approved by the University's Board of Trustees on October 29, 1968:

Any student suspended from The George Washington University on the grounds of exceeding the bounds of free assembly and lawful advocacy shall have his suspension reviewed by the Hearing Committee on Student Affairs† of The George Washington University as soon after order is restored as is practicably possible.

*The University Senate has been renamed the Faculty Senate.
†The duties and functions of the Hearing Committee on Student Affairs are now performed by the Joint Committee of Faculty and Students.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its tradition commitment to freedom of expression (a) by continuing to permit business an government organizations which are recruiting employees to conduct the activities at designated places on campus, and (b) by placing no obstacle t students who may wish to protest the presence of such recruiters, provided however, that such protest shall be orderly and shall not impede or disrupt th recruiter in his activities.

The University affirms its place as a forum for the free exchange of ideas (a) by assuring that guests invited to speak on this campus at duly scheduled meetings shall have the right to appear and to be heard, and (b) by sanctioning the freedom of students to express dissent from the views of the speaker, provided, however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-obstruction; it accepts the former as a legitimate expression of dissent while rejecting the latter as an abridgement of the freedoms of the individuals who may be its object.

The following was approved by the University's Board of Trustees on October 19, 1968:

The George Washington University is opposed to discrimination based on race, color, or creed. Such discrimination may have appeared in campus organizations in the past. In the future, however, no organization can be recognized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent, considered adequate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on October 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, research, and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the University,

may be punished for his conduct by dismissal from the University, or by some lesser disciplinary action, through procedures established within the University for the government of its members.

In order to insure due process, any student subject to dismissal or other disciplinary action on the grounds of violating any of the premises of this resolution shall have, at his discretion, the right of review of the action by the University Hearing Committee on Student Affairs.*

*The duties and functions of the Hearing Committee on Student Affairs are now performed by the Joint Committee of Faculty and Students.

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NATIONAL LAW CENTER, Dean of the Center

SCHOOL OF ENGINEERING AND APPLIED SCIENCE, Dean of the School

UNDERGRADUATE AND GRADUATE CATALOGUE (Arts and Sciences, Education, Government and Business Administration, Public and International Affairs), Office of Admissions

SCHOOL OF MEDICINE, Admissions Office, School of Medicine

SUMMER SESSIONS CATALOGUE, Dean of the Summer Sessions

SCHEDULE OF CLASSES: FALL AND SPRING SEMESTERS, Registrar

SCHEDULE OF CLASSES: SUMMER SESSIONS, Dean of the Summer Sessions

6/72—Cornelius—15M

COLLEGES AND SCHOOLS—DEGREE PROGRAMS

COLUMBIAN COLLEGE OF ARTS AND SCIENCES: Associate in Arts (A.A.), Associate in Arts in General Studies (A.A. in Gen.Std.), Bachelor of Arts (B.A.), Bachelor of General Studies (B.Gen.Std.), Bachelor of Science (B.S.), Bachelor of Science in Environmental Health (B.S. in Env.Health), Bachelor of Science in Geodetic and Cartographic Science (B.S. in Geod. and Cart.Sc.), Bachelor of Science in Medical Technology (B.S. in Med.Tech.), and Bachelor of Science in Oceanography (B.S. in Ocea.)

GRADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master of Arts in Special Studies (M.A. in Sp.Std.), Master of Fine Arts (M.F.A.), Master of Music (Mus.M.), Master of Science (M.S.), Master of Science for Teachers (M.S. for Teachers), Master of Science in Forensic Science (M.S. in Forens.S.), Master of Science in Special Studies (M.S. in Sp.Std.), and Doctor of Philosophy (Ph.D.)

SCHOOL OF MEDICINE: Doctor of Medicine (M.D.)

NATIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Master of Comparative Law (M.Comp.L.), Master of Comparative Law (American Practice) (M.Comp.L.(Am.Prac.)), and Doctor of Juridical Science (S.J.D.)

SCHOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil Engineering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) (B.S. (E.E.)), Bachelor of Science (Mechanical Engineering) (B.S. (M.E.)), Master of Science (M.S.), Master of Engineering Administration (M.E.A.), and Doctor of Science (D.Sc.)

SCHOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.). Bachelor of Science in Physical Education (B.S. in P.E.), Master of Arts in Education (M.A. in Ed.). Master of Arts in Teaching (M.A.T.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Business Administration (B.B.A.), Bachelor of Science in Administration (B.S. in Adm.), Master of Arts in Government (M.A. in Govt.), Master of Arts in Health Care Administration (M.A. in H.C.A.), Master of Business Administration (M.B.A.), Master of Public Administration (M.P.A.), Master of Science in Administration (M.S. in Adm.), Master of Urban and Regional Planning (M. Urb. and Reg.Plan.), Post-Master's Graduate Certificate in Health Care Administration (Grad.Cert. in H.C.A.), Doctor of Business Administration (D.B.A.), and Doctor of Public Administration (D.P.A.)

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A.), Master of Arts (M.A.), and Master of Science in International Affairs (M.S. in I.A.)

THE GEORGE WASHINGTON UNIVERSITY

COLUMBIAN COLLEGE OF ARTS AND SCIENCES, 1821

THE GRADUATE SCHOOL OF ARTS AND SCIENCES, 1893

THE SCHOOL OF MEDICINE, 1825

THE NATIONAL LAW CENTER, 1865

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE, 1884

THE SCHOOL OF EDUCATION, 1907

THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION, 1928

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS, 1928

THE COLLEGE OF GENERAL STUDIES, 1950

THE DIVISION OF UNIVERSITY STUDENTS, 1930

THE SUMMER SESSIONS, 1916

THE UNIVERSITY HOSPITAL, 1898

The George Washington University Bulletin



SUMMER
SESSIONS
CATALOGUE

1972



THE GEORGE WASHINGTON UNIVERSITY BULLETIN

THE SUMMER SESSIONS 1972

WASHINGTON, D.C. 20006

FACTS ABOUT GEORGE WASHINGTON UNIVERSIT

General Information	Private, nonsectarian, coeducational, founded 1821
Location	Washington, D.C., bounded by Pennsylvania Avenue and 19th, F, and 24th Streets, N.W.
Number of Students 1971 Summer Sessions	5,361 (3,378 men, 1,983 women)
Geographical Origin of Students 1971 Summer Sessions	50 states, District of Columbia, Puerto Rico, Virgin Islands, 70 foreign countries
Number of Full-time Faculty 1971 Summer Sessions	231
Number of Part-time Faculty 1971 Summer Sessions	86
Students from Other Institutions Enrolled in the 1971 Summer Sessions	276 students from 160 institutions
Residence Hall Rates 1972 Summer Sessions	Multiple occupancy, $125 a five-week session; single occupancy, $175 a five-week session (see page 22)

Undergraduate majors: Accounting, American Civilization, American Literature, Anthropology, Applied Mathematics, Applied Statistics, Art History and Theory, Biology, Botany, Business Administration, Chemistry, Chinese Studies, Civil Engineering, Classical Archeology and Greek, Classical Humanities, Dramatic Art, Economics, Electrical Engineering, Elementary Education, English Literature, Fine Arts, French Language and Literature, Geography, Geology, Germanic Languages and Literatures, History, International Affairs, International Business, Journalism, Latin, Latin American Studies, Mathematical Statistics, Mathematics, Mechanical Engineering, Medical Technology, Music (Applied, History and Literature, Theory), Philosophy, Physical Education, Physics, Political Science, Premedicine, Psychology, Public Affairs, Religion, Russian Language and Literature, Russian Literature and Culture—in Translation, Secondary Education, Sociology, Spanish American Literature, Spanish Language and Literature, Speech Communication, Speech Pathology and Audiology, Zoology.

Study leading to graduate or professional degrees is offered in the Graduate School of Arts and Sciences, the National Law Center, the School of Medicine, the School of Engineering and Applied Science, the School of Education, the School of Government and Business Administration, and the School of Public and International Affairs.

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A SUMMER SEMESTER IN THE NATION'S CAPITAL

THE GEORGE WASHINGTON UNIVERSITY offers a two-term summer program which makes it possible for students to earn 14 semester hours of credit during the summer months. The Library, classrooms, and residence hall are air-conditioned. For term dates, see the calendar on pages 5 and 6.

THE GEORGE WASHINGTON UNIVERSITY BULLETIN
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CALENDAR FOR THE 1972 SUMMER SESSIONS

pplication for Graduation—An "Application for Graduation" form *must* be ed and the appropriate fee paid at the time of registration for the summer sion of the senior or final year. Students completing degree requirements ring the Summer Sessions will be awarded diplomas (no formal convocation) ptember 30, 1972, provided they have completed all degree requirements and ve applied for graduation as a part of registration for the Summer Sessions.

COLUMBIAN COLLEGE OF ARTS AND SCIENCES

GRADUATE SCHOOL OF ARTS AND SCIENCES

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

DIVISION OF UNIVERSITY STUDENTS

First Session

June 12	Registration for first 5-week session and 8-week courses (10 am–7 pm) *Monday*
June 13	First 5-week session classes and 8-week courses begin *Tuesday*
June 28	D.B.A., D.P.A., and Ph.D. dissertations completed in the summer due in appropriate Dean's Office *Wednesday*
July 4	Holiday *Tuesday*
July 18	First 5-week session classes end *Tuesday*
July 19	First 5-week session examination day *Wednesday*
August 4	Eight-week courses end *Friday*
August 23	Master's theses completed in summer due in appropriate Dean's Office *Wednesday*

Second Session

July 20	Registration for second 5-week session (10 am–6 pm) *Thursday*
July 21	Second 5-week session classes begin *Friday*
August 4	Eight-week courses end *Friday*
August 23	Master's theses completed in summer due in appropriate Dean's Office *Wednesday*
August 24	Second 5-week session classes end *Thursday*
August 25	Second 5-week session examination day *Friday*

NATIONAL LAW CENTER

June 5	Registration for all sessions (12–7 pm) *Monday*
June 6	First session and 13-week session begin *Tuesday*
July 4	Holiday *Tuesday*
July 14	First-session classes end *Friday*
**July 17–19*	First-session examination period *Monday–Wednesday*
July 20	Registration for students attending second session only (2–4 pm) *Thursday*
July 21	Second-session classes begin *Friday*
August 30	Last day of classes *Wednesday*
August 31–September 2	Second session and 13-week session examination period *Thursday–Saturday*

SCHOOL OF EDUCATION

June 12	First 3-week workshop session registration (10 am–7 pm) *Monday*
June 13	First 3-week workshop session classes begin *Tuesday*
June 30	First 3-week workshop session classes end *Friday*
July 3	Second 3-week workshop session registration (9 am–6 pm); classes begin *Monday*
July 3	Six-week session registration (9 am–6 pm); classes begin *Monday*
July 3	Ed.D., Ed.S., and M.A. in Ed. July comprehensive examination applications due *Monday*
July 4	Holiday *Tuesday*
July 15	National Teacher Examinations *Saturday*
July 21	Second 3-week workshop session classes end *Friday*
July 22	Ed.D., Ed.S., and M.A. in Ed. comprehensive examinations *Saturday*
July 24	Third 3-week workshop session registration (9 am–5 pm); classes begin *Monday*
August 11	Six-week session and third 3-week workshop session classes end *Friday*
August 11	Ed.D. dissertations completed in summer due *Friday*

FALL SEMESTER 1972–73

September 7–9	Registration—*Thursday–Saturday*

* Classes scheduled Wednesday evenings for the 13-week session will meet on Wednesday, July 19

THE UNIVERSITY

HISTORY AND ORGANIZATION

THE GEORGE WASHINGTON UNIVERSITY had its beginning in 1821 as The Columbian College in the District of Columbia. The name of the institution was changed in 1873 to Columbian University and in 1904 to The George Washington University. The debt of the University to George Washington, whose name it bears, is an intangible one.

George Washington, as President and as private citizen, had urgently insisted upon the establishment of a National University in the federal city. There he hoped that, while being instructed in the arts and sciences, students from all parts of the country would acquire the habits of good citizenship, throwing off local prejudices and gaining at first hand a knowledge of the practice, as well as the theory, of republican government. To further the materialization of his hopes, Washington left a bequest of fifty shares of The Potomac Company "towards the endowment of a University to be established within the limits of the District of Columbia, under the auspices of the General Government, if that government should incline to extend a fostering hand towards it." The Congress never extended "a fostering hand." The Potomac Company passed out of existence, and Washington's bequest became worthless.

Fully conscious of Washington's hopes, but motivated primarily by a great missionary urge and the need for a learned clergy, a group of dedicated ministers and laymen sponsored a movement for the establishment of a college in the District of Columbia. Inspired largely by the zeal and energy of the Reverend Luther Rice, they raised funds for the purchase of a site and petitioned Congress for a charter. After much delay and amendment, Congress granted a charter which was approved by President Monroe on February 9, 1821. To safeguard the College's nonsectarian character it provided "that persons of every religious denomination shall be capable of being elected Trustees; nor shall any person, either as President, Professor, Tutor or pupil, be refused admittance into said College, or denied any of the privileges, immunities, or advantages thereof, for or on account of his sentiments in matters of religion."

During the entire time when the institution was known as Columbian College, its activities were centered on College Hill, a tract of forty-six and a half acres between the present Fourteenth and Fifteenth Streets extending north from Florida Avenue to somewhat beyond Columbia Road. The Medical School was located downtown. For the better part of the Columbian University period, the buildings of the University were situated along H Street between Thirteenth and Fifteenth Streets. The Medical School group still remains there.

During the last half century the University's present plant has been deve
oped in that section of the old First Ward familiarly known as "Foggy Bottom
between Nineteenth and Twenty-fourth Streets, south of Pennsylvania Avenu
Within a few blocks are the White House, the Department of the Interior, th
State Department, the World Bank, and many other governmental offices an
international agencies. The area is not without its reminders of historic intere
to the University. President Monroe, who signed the Charter, lived at 201
Eye Street. The first President of the Board of Trustees, the Reverend Obadia
B. Brown, was for fifty years the pastor of a church at Nineteenth and Ey
Streets, and Washington selected Twenty-third and E Streets as the site of th
National University he hoped to see established.

The University as it is now organized consists of Columbian College of Art
and Sciences (undergraduate); the Graduate School of Arts and Sciences; th
professional schools, which include the National Law Center and the school
of Medicine, Engineering and Applied Science, Education, Government an
Business Administration, and Public and International Affairs; the College o
General Studies; the Division of University Students; and the Summer Sessions

The George Washington University is privately endowed and is governed by
a self-perpetuating Board of Trustees of which the president is an ex officio
member.

ACADEMIC STATUS

The George Washington University is accredited by its regional accrediting
agency, the Middle States Association of Colleges and Secondary Schools.

The University is on the approved list of the American Association of Uni-
versity Women and is a member of the College Entrance Examination Board.

The National Law Center is a charter member of the Association of Ameri-
can Law Schools and is approved by the Section of Legal Education and Ad-
missions to the Bar of the American Bar Association. The School of Medicine
is a member of the Association of American Medical Colleges and is one of
the medical colleges which have been continuously approved by the American
Medical Association. Curricula of the School of Engineering and Applied
Science in Civil, Electrical, and Mechanical Engineering are accredited by the
Engineer's Council for Professional Development. The School of Education is
a charter member of the American Association of Colleges for Teacher Edu-
cation and is accredited by the National Council for Accreditation of Teacher
Education for its Bachelor's and Master's degree programs. The School of
Government and Business Administration has maintained full membership in
the Middle Atlantic Association of Colleges of Business Administration since
1961. It joined the Council on Graduate Education for Public Administration
in 1966. By invitation, in 1968, the School became a charter academic mem-
ber of the American Association of Collegiate Schools of Business Assembly.
The programs in Public Accounting designed to prepare students for Certified
Public Accountants examinations have been approved by the state boards of
New York and of Maryland. The Program in Hospital Administration is
accredited by the National Accrediting Commission on Graduate Education
for Hospital Administration. The Department of Chemistry is on the approved
list of the American Chemical Society. The graduate program in clinical psy-
chology in the Department of Psychology is on the approved list of the Ameri-
can Psychological Association.

EDUCATIONAL FACILITIES

The University Library.—The University Library contains over 545,000 volumes and, with the exception of the law and medical collections, is housed in the Library Building.

Regulations governing the use of the Library, the circulation of books, and the use of reserve books and periodicals are available at the service desks of the Library.

Other Library Facilities in Washington.—The student has access also to the Library of Congress, the Public Library of the District of Columbia and its branches, the Library of the Pan American Union, the Library of the Bureau of Railway Economics, the Library of the United States Department of Agriculture, the Library of the United States Office of Education, the National Library of Medicine, the Library of the Smithsonian Institution, and many other great special collections of the government departments.

Research Facilities of Washington.—The arrangement of the summer schedule of classes permits the full-time student to avail himself of the opportunity to study, at first hand, the working of the federal government and so to form a background for intelligent and useful citizenship.

In the departmental libraries of the federal government are a multitude of reports made by eminent specialists in all fields of science on the results of study and research in the bureaus, experimental stations, laboratories, museums, and observatories of the nation.

In addition to the governmental collections the student has available the research facilities of such scientific and educational groups, whose headquarters are situated in Washington, as the Carnegie Institution, the American Council on Education, the National Academy of Sciences, the National Research Council, the National Education Association, and the National Geographic Society.

CONSORTIUM OF UNIVERSITIES OF THE WASHINGTON METROPOLITAN AREA, INC.

Five universities in Washington, D.C.—American University, Catholic University of America, *George Washington University*, Georgetown University, and Howard University—have formed a Consortium through which they are coordinating the use of their respective facilities. As the arrangement develops, students in approved programs leading to degrees in any one of the universities will increasingly have the opportunity to select from the combined offerings of all five universities the particular courses which best meet their needs.

Participation is limited to campus degree candidates. The following, however, are excluded: students in Canon Law, Law, Dentistry, Medicine, and Theology.

In special courses such as private instruction (as in music or art) or tutorial study, if a special fee is charged, this fee is not covered by the Consortium agreement and must be paid by the individual student to the university administering the course. Courses offered in Reserve Officer Training Corps programs are excluded. *A student may not take courses at another university that are available at his own.*

The student registers and pays at his own university for all Consortium courses. There are no refunds for Consortium courses in the summer.

See page 16 for information concerning registration for Consortium courses.

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Students
Lawrence Winkler, M.A., Ed.D., *Assistant Dean of the Summer Sessions*

THE SUMMER SESSIONS

THE PROGRAMS OF THE SUMMER SESSIONS have been planned to meet the needs of full- and part-time students.

During the summer of 1972, Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Engineering and Applied Science, the School of Government and Business Administration, the School of Public and International Affairs, and the Division of University Students offer courses in two 5-week sessions, with some graduate seminars and courses extending over an 8-week period. The School of Engineering and Applied Science also offers courses in an 8-week period. The National Law Center offers courses in three sessions, and the School of Education offers courses in a 6-week session and three 3-week workshop sessions.

The time at which each course is offered (session and hours) is stated at the end of the course description.

Admission

APPLICATION FOR ADMISSION OR READMISSION

THE APPLICATION FOR ADMISSION to degree candidacy should be accompanied by a $25 application fee. There is no application fee for the student who is applying for nondegree status in the Division of University Students.

NONDEGREE STATUS

Application for nondegree status in the Division of University Students should be received, with any required credentials, by the Friday before the registration date of the session for which admission is sought (see Calendar, pages 5 and 6).

DEGREE CANDIDACY

Students from secondary schools wishing to begin college as degree candidates, in either the first or second term of the summer session, should apply during the fall term of the senior year. Preference will be given to students who submit applications and required credentials prior to March 1.

Undergraduate transfer students from other institutions, applicants for graduate programs, and *readmission applicants* must submit application and required credentials prior to May 1 for the first summer session and June 1 for the second summer session.

Records presented become the property of the University and *cannot* be returned.

APPLICATION FORMS

The tearout postcard form inside the back cover of this catalogue may be used to request the Dean of the Summer Sessions to furnish the appropriate form for admission or readmission to the University for nondegree status or for a degree program. Students who attended the University in the spring semester of 1972 do not need to reapply to attend the Summer Sessions.

THE STUDENT NOT SEEKING A DEGREE

The student not seeking a degree from this University should complete application for admission to the Division of University Students. (See paragraph above.) This nondegree-granting division makes the work of the University available to five types of applicants, in accordance with the following requirements:

1. The student registered for a program leading toward a degree at another institution is admitted to the extent that facilities permit. No transcript of record is required unless the student has been subject to academic or disciplinary action. The student must be in good standing and eligible to continue in the institution last attended during the past academic year.*

2. The student over 21 years of age who is not working for a degree in this or another institution may be admitted to take courses for which he has adequate preparation, as determined by the department concerned. A transcript of record is not usually required. However, the student must be able to affirm that he is in good standing and eligible to continue in the institution last attended during the past academic year.*

3. Applicants under 21 years of age who have graduated from high school within the previous two years and who have not attended a college or higher institution may be admitted if they meet the entrance requirements of Columbian College of Arts and Sciences (see pages 24–25).

4. Under special conditions, recent secondary school graduates under 21 years of age who have been accepted by a regionally accredited university or college for the fall semester of 1972 may be admitted for the *summer session only* without filing a transcript if they submit a photostatic copy of their letter of unconditional acceptance.

5. Secondary school students applying for admission to the Secondary School Honors Program may be admitted in accordance with the requirements stated on pages 37–38.

THE STUDENT SEEKING A DEGREE

An applicant from a secondary school must

1. Send to his high school principal the high school record form provided by the University, with the request that the completed form be mailed *to the Office of Admissions.*

2. Request that a report of College Entrance Examination Board test scores be sent to the Office of Admissions directly from the Educational Testing Service, Princeton, N.J., or Berkeley, Calif. Every applicant is required to submit scores on the Scholastic Aptitude Test and the English Composition Achievement Test. In addition, an Engineering applicant must take the Mathematics Test (Level I or II).

* No student is eligible for admission if he has been suspended within the past academic year.

The College Entrance Examination Board tests are preferred; however, the American College Testing battery scores will be accepted. The applicant should request that these scores be sent to the Office of Admissions directly from the American College Testing Program, Iowa City, Iowa. It is recommended that the applicant take the tests in October of the senior year.

An applicant who has attended one or more institutions of higher learning must request each registrar to mail to the Office of Admissions a transcript of his record, even though credits were not earned. An honorable dismissal is required from the institution last attended.

The report of the Graduate Record Examination, the Miller Analogies Test, or the Admission Test for Graduate Study in Business, where applicable, should accompany application to graduate degree candidacy.

Registration

A STUDENT MAY NOT REGISTER FOR CLASSES until admission to the University has been approved by the appropriate office.

A student previously registered in this University who was not registered for campus courses during the spring semester preceding this registration must apply for and receive a letter of readmission from the Office of Admissions (undergraduate and nondegree) or appropriate Dean's Office (graduate), before he is eligible for registration.

Registration days and hours are stated in the calendar at the front of this catalogue. All students except those in the National Law Center should report first to the first floor of the University Library, 2023 G Street, N.W., where they will be given materials and detailed information concerning registration procedures. Degree candidates in Law secure their registration packets and instructions at the Office of the Dean of the National Law Center in Stockton Hall.

Registration packets for all students (except those in the National Law Center) registering on June 12 and July 20 will be distributed from the University Library, 2023 G Street, N.W. On all other registration dates (Law excluded), packets will be distributed from the Office of the Registrar, Rice Hall, 2121 I Street, N.W.

Students planning to take courses in the first session and also in other sessions later in the summer may register at the first registration for *all* summer courses. Students who wish to register for the second five-week session, the second session in Law, or the second three-week, the six-week, or the third three-week session in Education may register on the stated registration dates for those sessions or on any earlier summer registration date (see Summer Sessions Calendar, pages 5–6). Tuition for all courses is due and payable in full at the time of registration.

Students expecting to complete requirements for degrees during the Summer sessions must apply for graduation as a part of registration for the Summer sessions and pay the appropriate fee.

In special instances, with the permission of the instructor, a person who has been admitted to the University may be registered as an auditor in a class with-

out being required to take active part or to pass examinations. No academ credit will be allowed for such attendance. A student who takes a course as a auditor may not repeat it for credit.

REGISTRATION BY GW STUDENTS FOR CONSORTIUM COURSES

Students interested in taking courses at any of the four other universities i the Consortium of Universities of the Washington Metropolitan Area, Inc. (se page 9), should consult the program announcements of the other universities Consortium application forms and instructions are available from the Registra after the student has obtained his registration packet.

In order to participate in the Consortium program (1) the graduate studen must obtain the approval of his adviser and should ascertain from the depart ment of the university where the course is taught whether or not he is eligibl for the course and whether there is space in the class, or (2) the undergraduat student must obtain the approval of his adviser and *must* ascertain from th department of the university where the course is taught whether or not he i eligible for the course and whether there is space in the class. Specific in quiries should be addressed to the Registrar.

CHANGES IN PROGRAM OF STUDY

Changes in programs of study may be made only with the permission of the adviser or major professor and the dean or director of the college, school, or division concerned.

Students should consult the deans' offices concerning final dates on which changes in schedule may be made.

Fees and Financial Regulations*

THE FOLLOWING FEES have been adopted for the summer of 1972:

Tuition Fees

For each semester hour† (except for work taken by the Doctoral candidates in residence in the University prior to the 1967 Summer Sessions)	$80.00

University Center Fee (charged all students registered on campus‡, non-refundable)

For each semester hour for which the student registers	3.50

* See the *National Law Center* catalogue for fees for law courses and programs.
† Candidates for doctoral degrees in residence in the University prior to the 1967 Summer Sessions may complete their programs under the schedule for payment of tuition fees in effect prior to July 1, 1967.
‡ The maximum charge for any student during the entire Summer Sessions will be $37.50. Students in the College of General Studies are charged the University Center Fee only when registered for courses on campus.

Additional Course Fees

In certain courses additional fees, such as laboratory and material fees, are charged as indicated in the course descriptions. These fees are due with the tuition fee for the course. Breakage of apparatus is charged against the individual student. When breakage is in excess of the normal amount provided for in the laboratory fee, the individual student will be required to pay such additional charges as are determined by the department concerned.

Graduation Fees

Associate in Arts	$10.00
Bachelor's, Master's, Education Specialist, and Doctor's degrees	25.00
Post-Master's Graduate Certificate in Health Care Administration	25.00
Fee for Binding Master's Thesis	10.00
Fee for Microfilm Service and Printing Announcement of Final Examination (Doctoral candidates)	60.00

Special Fees

Application fee (degree candidate) nonrefundable	25.00
Admission tests (when required)	6.00–12.00
Late-registration fee, for failure to register within the designated period	15.00
Late payment fee, charged for failure to make payments when due (see "Payment of Fees," below)	15.00
Financial reinstatement fee, for reinstatement after financial encumbrance for nonpayment of fees (see "Payment of Fees," below)	35.00
Returned check fee, charged a student whose check is returned because of insufficient funds or improper drafting	15.00
For each examination to qualify for advanced standing and for each special examination	5.00
Special Columbian College departmental examination for each course to qualify for receiving credit (advanced standing), waiver of requirement, *or both*	25.00
English test for foreign students (when required)	5.00
Laboratory check-out fee, for failure to check out of chemistry laboratory by the date set by the instructor	3.00
National Teacher Examinations fee, for Bachelor of Arts in Education degree candidates	9.00–13.00
Transcript fee, for each transcript of record	2.00

Registration on campus in the University entitles each student to the following University privileges: (1) the services of the Student Career Services Office; (2) the use of the University Library; and (3) medical attention as described under "Student Health Service" (see page 20). These privileges terminate when the student withdraws or is dismissed from the University.

PAYMENT OF FEES

No student is permitted to complete registration or to attend classes until all fees are paid. Fees for each session are due in advance at the time of registration.

Students who fail to make any payment when due will be automatically charged a $15 late payment fee. Accounts which become 30 days past due

will be financially encumbered and will be subject to the interest charge o 8 per cent per annum. In the event a student's account is financially en cumbered, the student forfeits his rights to the use of deferred payment con tracts in future semesters, and the Student Accounts Office will notify th Registrar to withhold grades, future registration privileges, transcripts, diplo mas, and other academic information until the account is settled financially Financial settlement will require payment in full of all amounts due the Uni versity in addition to a financial reinstatement fee of $35.

Students auditing courses are subject to all fees charged to students regis tered for credit.

WITHDRAWALS AND REFUNDS

Registrations are for the session, and no refunds or rebates are allowed; this regulation also applies to courses taken through the Consortium of Universities of the Washington Metropolitan Area, Inc. In no case will tuition be refunded because of absence from classes.

Payments apply only to the session for which registration charges are in curred, and in no case will these payments be credited to another session or term.

Students in chemistry who fail to check out of the laboratory on or before the date set by the instructor, unless excused by the instructor, will be charged a $3 check-out fee. A student who drops a course before the end of the session must check out of the laboratory at the next regular laboratory period.

Authorization to withdraw and certification for work done will not be given a student who does not have a clear financial record.

University Regulations

STUDENTS IN THE SUMMER SESSIONS are subject to the same regulations governing students enrolled in a college, school, or division of the University during the academic year. Degree candidates are referred to the catalogues of the schools in which they are registered. Nondegree students should consult the *Undergraduate and Graduate Catalogue.*

Academic Credit.—The Summer Sessions are an integral part of the University. Academic credit for completed work will be given toward the appropriate degrees in the various colleges and schools of the University in accordance with their separate regulations and requirements.

Residence.—Summer Sessions work may be counted in residence but the candidate for a degree must satisfy the residence requirements of the school or college concerned.

Academic Work Load.—No full-time student may take more than 7 semester hours of work during each 5-week session. No student employed more than 20 hours a week may take more than 4 semester hours of work during each 5-week session.

In the School of Education, 3 semester hours constitutes a full-time program for full-time students in any one of the 3-week workshop sessions, and 6 semester hours represents full-time work in the 6-week session.

In the National Law Center the maximum amount of work that may be taken in each session by a full-time student is 6 semester hours; by an employed student, 4 semester hours.

In the School of Engineering and Applied Science the maximum amount of work that may be taken in a session by a full-time student is 6 semester hours.

The right is reserved by the University to dismiss or exclude any student from the University, or from any class or classes, whenever, in the interest of the student or the University, the University Administration deems it advisable to do so.

The right is reserved by the University to make changes in programs without notice whenever circumstances warrant such changes.

The University and its various colleges, schools, and divisions reserve the right to modify or change requirements, rules, and fees. Such regulations shall go into force whenever the proper authorities may determine.

The University is not responsible for the loss of personal property in any University building. A "Lost and Found" office is maintained on campus in the Safety and Security Office, Woodhull House, 2033 G Street, N.W.

UNIVERSITY POLICY ON THE RELEASE OF STUDENT INFORMATION

In general, the policy of the University is one of attempting to keep the student's record confidential and out of the hands of those who would use it for other than legitimate reasons. At the same time, the policy must be flexible enough not to hinder the student, the University, or the community in their legitimate endeavors.

No information concerning a student will be released except as noted below:

1. Information such as whether or not the student is currently enrolled; dates of attendance; verification of date and place of birth; degrees earned (if any), date, major field or area of concentration, and honors received; home and local addresses and telephone numbers; school, college, or division of enrollment, and class; verification of signature; name and address of parent or guardian.

2. The issuance of formal transcripts of record to recognized institutions of higher learning; the certification of academic achievement to the various recognized professional associations (law, medicine, engineering, education, etc.).

Additional information will be released only on written authorization from the student, or by court order or subpoena. If a subpoena is served, the student whose record is being subpoenaed will be notified and the subpoena will be referred to the University's legal counsel.

Government investigative agencies have no inherent right to access to student files and records. If expressly requested, properly identified representatives from federal, state, or local government agencies may be given the information listed under No. 1 above.

RECENTLY ESTABLISHED REGULATIONS

An Appendix (pages 101–3) contains regulations recently approved by the University's Board of Trustees.

Student Services and Activities

STUDENT HEALTH SERVICE

THE STUDENT HEALTH SERVICE is an outpatient clinic designed to assist all registered students with their health needs while attending the University. This service, located at 935 22nd Street, N.W. (in the H.C. Burns Memorial Building), assists with health conditions and medical emergencies by advice and treatment, proper referral when necessary, and cooperation with other physicians and medical facilities.

The weekday hours (subject to change) during the summer sessions are from 9 a.m. to 9 p.m.; Saturday hours are 9 a.m. to 12 noon. A physician is in attendance during these hours.

For serious illnesses or emergencies that occur when the Student Health Service is closed, students may call the Medical Bureau (223-2200), or go to the Emergency Room of the University Hospital for treatment. Charges for both of these services are solely the responsibility of the student.

Charges for services that are not available through the Student Health Service, such as X-ray and laboratory tests, specialty services, and consultations, etc., must be paid by the student.

The Student Health Service is available to the student only during the session in which he is enrolled.

A student intending to train for an athletic team is required to pass a medical examination. The University is not responsible for injuries received in intercollegiate or intramural games, or in any of the activities of the Department of Physical Education.

THE READING CENTER

The Reading Center offers individual diagnostic and corrective services for all levels: primary, elementary, secondary, and adult. In addition, special reading improvement classes are conducted for high school and college students as well as other adults.

A complete diagnosis includes psychological tests; vision, hearing, dominance, and spelling tests; and various types of reading achievement and aptitude tests. Results are interpreted, and a written report is presented in conference with the parents or the individual.

The special reading improvement classes for high school students, college students, and other adults are offered throughout the year at stated intervals. Emphasis is placed on improvement of vocabulary, speed, comprehension, and study skills. Instruction in spelling is also provided as needed. Mechanical aids such as the tachistoscope, rate accelerator, and controlled reader are available for increasing speed of comprehension.

Fees.—The fee for individual diagnosis is $75; for individual instruction, $8 a lesson; for semi-individual instruction, $6 a lesson; for instruction in small groups with common reading difficulties, $5 a lesson. Reading classes (15 two-hour sessions) are offered for adults, $125; for full-time George Washington University students, $60. All fees are payable in advance at the Office of the Cashier.

UNIVERSITY COUNSELING CENTER

The Center offers services to students enrolled in the University which are designed to assist individuals in the diagnosis and treatment of their educational,

personal, and social problems; to diagnose problems leading to academic difficulties; to offer vocational counseling and programmed instruction; and to refer individuals to qualified agencies for assistance with problems not handled by the Center. Behavior therapy, individual and group psychotherapy, and individual and group counseling are available.

The Center also provides special assessments including diagnostic measures prescribed by the School of Engineering and Applied Science, admissions tests for the University and for other selected educational institutions, and some selected assessments for business and industry.

Fee: Students who are currently registered as degree candidates in the University are entitled to one interview free of charge. If the student decides to continue to use the services offered, a minimum flat fee of $30 will be charged for short-term treatment. Fees for testing and long-term treatment depend upon the services involved. All fees are payable at the Counseling Center Office.

THE SPEECH AND HEARING CLINIC

The Speech and Hearing Clinic offers diagnostic and remedial work for children and adults with such communication difficulties as stuttering, lisping, cleft palate speech, and cerebral-palsied speech; and with voice, articulatory, and hearing problems. Diagnostic and remedial work is also available for persons with nonstandard language usage due to such conditions as hearing loss, brain damage, mental retardation, and environmental factors.

Fees.—The fee for an initial evaluation is $20. Fees for additional specialized testing are dependent on the testing involved. The fees for individual speech or hearing therapy range from $3 to $10 a session. Fees are reduced for full-time students enrolled in the University and for persons receiving group therapy. Fees are payable at the Office of the Cashier.

VETERANS EDUCATION

The Office of the Registrar assists students entitled to educational benefits as veterans or war orphans with any problems which may arise concerning their benefits. This Office also processes certification of enrollment and attendance to the Veterans Administration so that monthly allowances will be paid.

When feasible, students entitled to benefits as veterans or war orphans should consult the Office of the Registrar prior to submitting application to the Veterans Administration. All such students should obtain the instruction sheet issued by the Office of the Registrar, which sets forth requirements to be fulfilled before certification of enrollment can be made to the Veterans Administration, and which includes other information of general interest.

The Veterans Administration is at 2033 M Street, N.W., Washington, D.C. 20421.

RESIDENCE HALL

Men, women, and married couples (no children) will be housed in Thurston Residence Hall, 1900 F Street, N.W. This is a modern, air-conditioned building.

Admission to the University does not include a room reservation. A separate application for a room should be made well in advance.

RESIDENCE HALL RATES FOR 1972 SUMMER SESSIONS*

	Multiple Occupancy	*Single Occupancy*
Monthly	$100.00	$140.00
Weekly	25.00	35.00
Daily	5.00	7.00
Each regular 5-week Session	125.00	175.00

Residence hall payments are due and payable in advance. A student who fails to meet payment is subject to automatic suspension.

Forms for application, together with detailed information, may be obtained from the Director of Housing.

Information concerning off-campus housing near the University is available at the Office of the Director of Housing.

CLOYD HECK MARVIN CENTER

The Cloyd Heck Marvin Center houses a wide range of facilities that provide services and conveniences in an informal setting which may foster useful social relationships among members of the University community. The Center offers a variety of programs conducted by the University Program Board, performing arts departments, and other student and faculty organizations.

A two-board structure, representative of all elements of the University community, plays an important role in the day-to-day functioning of the Center. The Governing Board and the Operations Board work closely with the full-time staff in the development of procedures and policies which provide a framework for the Center's operation.

STUDENT AND ALUMNI CAREER SERVICES OFFICE

The Student and Alumni Career Services Office provides assistance to degree candidates and alumni seeking full-time, part-time, temporary, or permanent employment.

The Office maintains a registry of positions available in many fields, both locally and nationally, and refers qualified applicants for consideration. The Office administers the On-Campus Industrial and Government Recruitment Interview Program for seniors and graduate students, in which private companies, government agencies, service organizations, public school systems, and universities participate. The Office also handles the referral and placement functions of the on-campus College Work-Study Program. Prospective teachers may establish permanent credentials files in the Student and Alumni Career Services Office. This service includes files for alumni seeking college and university faculty and administrative positions. The Office also provides individual interviews for students and alumni wishing career guidance.

SOCIAL AND RECREATIONAL PROGRAM

The social and recreational program includes many varied activities and scheduled events. In addition to this campus program a great abundance of cultural as well as social and recreational opportunities is available to persons living in the metropolitan area. During the summer the University posts a weekly guide to these events on a bulletin board in the Cloyd Heck Marvin Center.

* The rates include linen service. Rates shown are subject to change.

THE COLLEGES, SCHOOLS, AND DIVISIONS

INFORMATION CONCERNING SPECIFIC REQUIREMENTS for degrees is omitted from this catalogue. For such information and other pertinent regulations, the student is referred to the catalogue of the school concerned.

COLUMBIAN COLLEGE OF ARTS AND SCIENCES

Since its founding in 1821, Columbian College has been the liberal arts unit of the University, offering baccalaureate degrees in all the traditional areas of the arts and sciences. Under a new academic plan, students have wide options in developing their academic programs, in earning advanced standing by examination, in devising interdepartmental majors, and, if qualified, in working toward a new three-year program leading to the regular degrees. Students are encouraged to select their major field as soon as possible, hopefully no later than the end of their freshman year. From that time, they receive their academic advice and guidance from the chosen major-field department. In addition to fulfilling major-field requirements, students are expected to broaden their cultural foundations in the Humanities, the Social Studies, and the Natural and the Mathematical Sciences. The College also provides prelegal and premedical programs and also the preprofessional work required for admission to the School of Education and to the School of Public and International Affairs.

THE DEGREES

Columbian College offers work leading to the following degrees: Associate in Arts, Bachelor of Arts, and Bachelor of Science. In cooperation with the School of Medicine, Columbian College offers work leading to the combined degrees of Bachelor of Arts and Doctor of Medicine. In cooperation with the Department of Pathology and the University Hospital, Columbian College offers work leading to the degree of Bachelor of Science in Medical Technology. Columbian College grants the following degrees to students in off-campus programs administered by the College of General Studies: Associate in Arts in General Studies, Bachelor of General Studies, Bachelor of Science in Environmental Health, Bachelor of Science in Geodetic and Cartographic Science, and Bachelor of Science in Oceanography.

ENTRANCE REQUIREMENTS

Requirements for admission to the freshman class are as follows:

1. An acceptable certificate of graduation from an accredited secondary school, showing at least fifteen units which must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and two years of college preparatory mathematics. It is to be noted that one unit of algebra, or the equivalent, is prerequisite to courses in chemis-

try and statistics, and that one unit in algebra and one unit in plane geometry, or the equivalent, are prerequisite to courses in mathematics and physics.

2. The principal's statement that the applicant is prepared to undertake college work.

3. College Entrance Examination Board scores, which must be submitted on the Scholastic Aptitude Test and the English Composition Achievement Test.*

A person who does not present all of the formal requirements stated above may request the Office of Admissions to present his case to the Columbian College Committee on Admission and Advanced Standing. The Committee may prescribe appropriate tests.

The applicant is responsible for

a. Sending the report form obtained from the Office of Admissions to his high school principal who will complete the form and forward it directly to the Office of Admissions.
b. Requesting a report of scores on the Scholastic Aptitude Test and the English Composition Achievement Test to be sent to the Office of Admissions by the Educational Testing Service, 20 Nassau Street, Princeton, N.J. 08540, or 1947 Center Street, Berkeley, Calif. 94704.

MAJOR FIELDS

Curricula leading to the degree of Bachelor of Arts are available in the following major fields:

American Civilization
American Literature
Anthropology
Applied Mathematics
Applied Statistics
Art History and Theory
Biology
Botany
Chemistry
Classical Archeology and Greek
Classical Humanities
Dramatic Art
Economics
English Literature
Fine Arts
French Language and Literature
Geography
Geology
Germanic Languages and Literatures
History
Journalism
Latin
Latin American Studies
Mathematical Statistics
Mathematics
Music:
  Applied Music
  Music History and Literature
  Music Theory
Philosophy
Physics
Political Science
Psychology
Religion
Russian Language and Literature
Russian Literature and Culture—in Translation
Sociology
Spanish American Literature
Spanish Language and Literature
Speech Communication
Speech Pathology and Audiology
Zoology

Curricula leading to the degree of Bachelor of Science are available in the following major fields:

Applied Mathematics
Applied Statistics
Biology
Botany
Chemistry
Geology
Mathematical Statistics
Mathematics
Physics
Zoology

* See page 15 for American College Testing Program.

THE GRADUATE SCHOOL OF ARTS AND SCIENCES

The Graduate School offers work leading to the following degrees: Master of Arts, Master of Arts in Special Studies, Master of Fine Arts, Master of Music, Master of Science, Master of Science for Teachers, Master of Science in Forensic Science, Master of Science in Special Studies, and Doctor of Philosophy. In cooperation with the School of Medicine, the Graduate School offers work leading to the combined degrees of Master of Science and Doctor of Medicine or Doctor of Philosophy and Doctor of Medicine.

ENTRANCE REQUIREMENTS

The entering graduate student must have an approved Bachelor's degree from an accredited higher institution, an appropriate distribution of courses, and a superior quality of work in the major field. Entering graduate students working toward the degree of Master of Science for Teachers must also have experience in teaching mathematics at the secondary school level.

GRADUATE FIELDS

Subject	Degrees Offered	
I. Humanities		
American Civilization	M.A.	Ph.D.
American Literature	M.A.	Ph.D.
Art:	M.F.A.	
Ceramics		
Design		
Graphics		
Painting		
Photography		
Sculpture		
Art History and Theory	M.A.	
Dramatic Art	M.F.A.	
English Literature	M.A.	Ph.D.
French Literature	M.A.	Ph.D.
Germanic Languages and Literatures	M.A.	Ph.D.
Museology	M.A.	
Music:	Mus.M.	
Applied Music		
Conducting		
Music Composition		
Music Theory		
Musicology	M.A.	
Philosophy	M.A.	
Religion	M.A.	
Religion and Medical Care	M.A.	
Religious Education	M.A.	
Russian Language and Literature	M.A.	
Spanish American Literature	M.A.	Ph.D.
Spanish Literature	M.A.	Ph.D.

Subject	Degrees Offered	
II. Social Sciences		
Anthropology	M.A.	
Economics	M.A.	Ph.D.
Geography	M.A.	
History	M.A.	Ph.D.
*International Relations		Ph.D.
Political Science	M.A.	Ph.D.
Sociology	M.A.	Ph.D.
III. Physical and Mathematical Sciences		
Applied Mathematics	M.A., M.S.	
Applied Statistics	M.S.	
Chemistry	M.S.	Ph.D.
Forensic Science	M.S. in Forens.S.	
Geochemistry	M.S.	Ph.D.
Geology	M.A., M.S.	Ph.D.
Mathematical Statistics	M.A.	Ph.D.
Mathematics	M.A.	Ph.D.
Physics	M.A.	Ph.D.
IV. Biomedical and Related Sciences		
Anatomy	M.S.	Ph.D.
Biochemistry	M.S.	Ph.D.
†Biological Sciences	M.S.	Ph.D.
Biophysics		Ph.D.
Genetics	M.S.	Ph.D.
Human Ecology		Ph.D.
Microbiology	M.S.	Ph.D.
Mycology	M.S.	
Pathology	M.S.	Ph.D.
Pharmacology	M.S.	Ph.D.
Physiology	M.S.	Ph.D.
Psychology	M.A.	Ph.D.
Speech Pathology and Audiology	M.A.	

THE NATIONAL LAW CENTER

The National Law Center offers work leading to the degrees of Juris Doctor, Master of Laws, Master of Comparative Law, Master of Comparative Law (American Practice), and Doctor of Juridical Science.

Forms for application for admission and information concerning course offerings may be obtained from the Office of the Dean of the National Law Center, 720 Twentieth Street, N.W., Washington, D.C. 20006.

* The School of Public and International Affairs offers a Master of Arts field in International Affairs.

† Biology, Botany, and Zoology.

THE SCHOOL OF ENGINEERING AND APPLIED SCIENCE

The School of Engineering and Applied Science offers courses leading to the degree of Bachelor of Science in the following areas: Civil Engineering (with Environmental Civil Engineering option), Electrical Engineering (with Computer Science option), and Mechanical Engineering. Graduate programs lead to the degrees of Master of Science, Master of Engineering Administration, and Doctor of Science. The School also grants the degrees of Master of Science and Master of Engineering Administration to students in off-campus programs administered by the College of General Studies.

ENTRANCE REQUIREMENTS FOR THE BACHELOR OF SCIENCE DEGREE

The School admits those applicants who can benefit themselves and society by disciplined intellectual effort in its environment.

Admission is the first selective step in a long series of qualifying steps the student will take in his progress toward professional competence in engineering. It indicates the School's belief that the applicant has at least the minimum preparation and ability to complete the curriculum successfully.

The applicant must be of good character and must have an academic background appropriate for the program of studies contemplated.

Consideration for admission is based on the following:

1. An acceptable certificate of graduation from an accredited high school showing at least fifteen units*;
2. The principal's statement that the applicant is prepared to undertake college work;
3. Scores on the following College Entrance Examination Board tests: the Scholastic Aptitude Test, the English Composition Achievement Test, and a Level I (Standard) or Level II (Intensive) Mathematics Test—Level I preferred.

The qualifications of applicants who, because of unusual circumstances, do not meet the above requirements will be considered by the School, which may prescribe admission tests.

Nine and one-half of the fifteen units required for entrance must be distributed as follows: three in English, two in algebra, one in plane geometry, one-half in plane trigonometry, one in physics or chemistry, and two in one foreign language or history. General science may not be counted in satisfaction of the science requirement but may be counted as an elective unit.

It is recommended that *both* physics and chemistry be studied in high school. A high school course in solid geometry is recommended as a firm foundation for college mathematics.

An applicant must arrange to have sent directly *from his school to the Office of Admissions of the University* the academic record of his first seven terms in secondary school, together with a personal evaluation and recommendation from his principal. This information may be supplied on a form provided by the University or on a standard form used by the secondary school provided the essential information is included.

Quantitative Deficiency.—A graduate of an approved high school who lacks no more than two units of the required subjects and who presents fifteen ac-

* A unit represents a year's study in a secondary school subject, including in the aggregate not less than 120 sixty-minute periods of prepared classroom work.

ceptable units may be admitted to a prescribed program which includes courses to make up his deficiencies.

ENTRANCE REQUIREMENTS FOR THE MASTER'S DEGREES

Admission to graduate study toward a Master's degree requires an appropriate Bachelor's degree from a recognized institution and evidence of capacity for productive work in the field selected, as indicated by undergraduate grades, Graduate Record Examination scores, and similar data.

An applicant who has significant deficiencies in preparation may be required to take prescribed undergraduate courses as an unclassified student before being admitted to graduate student status. In some cases, if such deficiencies are minimal, he may be admitted to graduate student status and allowed to take a limited number of graduate courses while completing the undergraduate courses in which he is deficient. In no case may the undergraduate courses thus taken fulfill any part of the requirements for the Master's degree.

ENTRANCE REQUIREMENTS FOR THE DOCTOR'S DEGREE

The applicant must have adequate preparation for advanced study, including a satisfactory Master's degree, or the equivalent, together with acceptable personal qualities and a capacity for creative scholarship. Well in advance of the opening of the semester for which the student seeks admission, he should correspond with and preferably have a personal interview with the Dean or department chairman of his proposed field of study, to discuss the University's facilities for guidance in this field, the applicant's qualifications, and the possibilities of an effective doctoral program.

THE SCHOOL OF EDUCATION

The School of Education prepares teachers, counselors, and administrators for the higher ranges of educational service and offers opportunities to teachers of experience to extend their education. The schedule of courses is arranged to meet the needs of employed students as well as those able to devote full time to their studies. Students pursuing programs involving teacher certification must make arrangements to student-teach in the fall or spring semester during hours when public schools are in session. The School offers both graduate and undergraduate work.

THE DEGREES

The School of Education offers work leading to the following degrees: Bachelor of Arts in Education, Bachelor of Science in Physical Education, Master of Arts in Education, Master of Arts in Teaching, Education Specialist, and Doctor of Education. The School also grants the degree of Master of Arts in Education to students in the off-campus programs administered by the College of General Studies.

ENTRANCE REQUIREMENTS

For the Bachelor's Degrees.—The satisfactory completion of two years of

approved college work, or graduation from an approved two-year college, or the equivalent, is required.

For the Degree of Master of Arts in Education.—Candidates whose undergraduate preparation does not include equivalents of the basic requirements for the degree of Bachelor of Arts in Education must make up deficiencies and may be required to take designated tests.

For the Degree of Master of Arts in Teaching.—To be admitted as a student-intern, an applicant must (1) have a Bachelor's degree from an accredited liberal arts institution, including courses related to the general education requirements for teacher certification; (2) show evidence of interest in children and a sincere desire to teach; (3) submit three written references attesting to quality of academic record and personality; (4) submit a score on the Aptitude Test of the Graduate Record Examination or the Miller Analogies Test; and (5) be interviewed by the University Selection Committee, or under arrangements specified by the Committee and approved by the Dean of the School of Education.

For the Degree of Education Specialist.—The degree of Master of Arts in Education from this University, or the equivalent; a satisfactory score on the Miller Analogies Test or the Graduate Record Examination; and two years of successful pertinent experience are required. Each applicant must be interviewed and recommended by a staff member of the School of Education or by a representative in the candidate's locality appointed by the Dean.

For the Degree of Doctor of Education.—The applicant must have adequate preparation for advanced study, including graduate work in fields prerequisite to his objective equivalent to that required for the degree of Master of Arts in Education at this University, at least three years of successful pertinent educational experience, acceptable personal qualities, and capacity for creative scholarship and effective leadership.

THE SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION

The School of Government and Business Administration offers work leading to the following degrees: (1) Bachelor of Business Administration with a major in Accounting, Business Administration, or International Business; (2) Master of Arts in Government in the fields of Personnel Management, Public Administration, or Urban and Regional Planning; (3) Master of Arts in Health Care Administration; (4) Master of Business Administration with fields of concentration in Accounting, Behavioral Factors in Administration, Business-Government Relations, Data Processing, Finance and Investments, Health Care Administration, International Business, Managerial Economics, Marketing, Operations Research and Systems Analysis, Personnel Management, Procurement and Contracting, Research and Development—Policy and Management, or Transportation; (5) Master of Public Administration in the fields of Health Care Administration, Personnel Management, Public Administration, or Urban and Regional Planning; (6) Master of Urban and Regional Planning; (7) Post-Master's Graduate Certificate in Health Care Administration; (8) Doctor of Business Administration; and (9) Doctor of Public Administration. The School also grants the degrees of Bachelor of Science in Administration and

Master of Science in Administration to students in off-campus programs administered by the College of General Studies.

ENTRANCE REQUIREMENTS FOR THE BACHELOR'S DEGREE

Requirements for admission to the freshman class are as follows:

1. An acceptable certificate of graduation from an accredited secondary school, showing at least fifteen units which must include four years of English; at least two years of one foreign language; two years of science, preferably with laboratory instruction; two years of social studies, one of which must be American history; and two years of college preparatory mathematics. It is to be noted that one unit of algebra, or the equivalent, is prerequisite to courses in chemistry and statistics, and that one unit in algebra and one unit in plane geometry, or the equivalent, are prerequisite to courses in mathematics and physics.
2. The principal's statement that the applicant is prepared to undertake college work.
3. College Entrance Examination Board scores, which must be submitted on the Scholastic Aptitude Test and the English Composition Achievement Test.*

A person who does not present all of the formal requirements stated above may request the Office of Admissions to present his case to the School of Government and Business Administration. The School may prescribe appropriate tests.

The applicant is responsible for

a. Sending the report form obtained from the Office of Admissions to his high school principal who will complete the form and forward it directly to the Office of Admissions.
b. Requesting a report of scores on the Scholastic Aptitude Test and the English Composition Achievement Test to be sent to the Office of Admissions by the Educational Testing Service, 20 Nassau Street, Princeton, N.J. 08540, or 1947 Center Street, Berkeley, Calif. 94704.

ENTRANCE REQUIREMENTS FOR THE MASTER'S DEGREES

A Bachelor's degree from an accredited college or university, that includes at least 90 semester hours of academic work with a quality-point index of 3.00 (*B* average) in the relevant undergraduate field, is required.

Applicants for admission to all Master's degree programs are required to take either the Admission Test for Graduate Study in Business or the aptitude sections of the Graduate Record Examination, both of which are administered by the Educational Testing Service. Master of Business Administration applicants must submit scores on the Admission Test for Graduate Study in Business; Master of Arts in Government, Master of Arts in Health Care Administration, Master of Public Administration, or Master of Urban and Regional Planning applicants may submit scores on either the Admission Test for Graduate Study in Business or the Graduate Record Examination. Any test scores submitted must have been recorded within three years of the date of application.

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* See page 15 for American College Testing Program.

ENTRANCE REQUIREMENTS FOR THE DOCTOR'S DEGREES

Doctor of Business Administration.—The degree of Master of Business Administration, Master of Arts in an approved field, or the equivalent, together with acceptable personal qualities and a capacity for creative scholarship, is required. Applicants must file results of the Admission Test for Graduate Study in Business administered by the Educational Testing Service.

Doctor of Public Administration.—The degree of Master of Public Administration, Master of Arts in an approved field, or the equivalent, together with acceptable personal qualities and a capacity for creative scholarship, is required. Applicants must file results on either the Admission Test for Graduate Study in Business *or* the aptitude sections of the Graduate Record Examination administered by the Educational Testing Service.

THE SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS

The School of Public and International Affairs offers work leading to the degrees of Bachelor of Arts with a major in International Affairs, Chinese Studies, or Public Affairs; Master of Arts in the fields of International Affairs, Public Affairs, Russian Studies, and Science, Technology, and Public Policy.

ENTRANCE REQUIREMENTS FOR THE BACHELOR OF ARTS DEGREE

With a major in International Affairs, Chinese Studies, or Public Affairs.—The satisfactory completion of the appropriate curriculum for the freshman and sophomore years in Columbian College of Arts and Sciences, or the equivalent, is required.

ENTRANCE REQUIREMENTS FOR THE MASTER OF ARTS DEGREE

A Bachelor's degree from an accredited college or university is required. Students admitted to candidacy must have attained a *B* average or equivalent in the relevant undergraduate fields.

In the field of International Affairs.—The applicant's undergraduate program should include background courses corresponding to an undergraduate major in international affairs at this University.

In the field of Public Affairs.—An undergraduate major in public affairs, economics, history, or political science, depending on the field of specialization, is required.

In the field of Russian Studies.—The applicant's undergraduate program should include appropriate background courses in history, political science, and Russian language.

In the field of Science, Technology, and Public Policy.—No particular undergraduate concentration is required. The desirable qualifications are both superior competence in a specific discipline and potential aptitude for cross-disciplinary work.

THE COLLEGE OF GENERAL STUDIES

The College of General Studies administers the off-campus degree programs over which Columbian College of Arts and Sciences, the Graduate School of Arts and Sciences, the School of Engineering and Applied Science, the School of Education, and the School of Government and Business Administration have degree-granting authority. The College also offers credit courses in liberal arts, education, and business administration for which there is sufficient demand. Special programs are offered to meet the in-service needs of specified groups. As a community service, a regular program of noncredit courses without entrance requirements is also offered.

ENTRANCE REQUIREMENTS

Off-campus Credit Courses.—A simplified procedure is used for admission and registration in off-campus courses. Transcripts of previous academic work are not required. Registration is restricted to those whose qualifications would indicate that they are able to carry the course successfully. Registration in an off-campus course does not constitute admission to degree candidacy in the University.

Noncredit Courses.—In general, noncredit courses will be open to any individual interested in enrolling. When a noncredit course is organized at the request of some particular agency or group, admission may be restricted to the students recommended by the sponsoring organization. A limit on the size of classes may have to be imposed in order to maintain the quality of instruction.

The separate catalogue of the College of General Studies, available at the College, 706 Twentieth Street, N.W., Washington, D.C. 20006, contains full information concerning programs, courses, entrance and degree requirements, and fees.

THE DIVISION OF UNIVERSITY STUDENTS

The Division of University Students makes the work of the University, in its several colleges and schools, accessible to five types of students who are not working toward a degree in this University (see page 14).

SPECIAL PROGRAMS AND WORKSHOPS

THE SUMMER SESSIONS is pleased to announce a carefully planned group of special programs and workshops devised to serve a variety of student needs and to utilize resources which are uniquely present at the University and in the nation's capital. These programs, which are described below, have been developed in many areas. They all have a strong academic orientation and will be taught by the regular faculty of the University or distinguished visitors from other institutions.

Dance Workshop

JUNE 5 TO JUNE 23*

THE PROGRAMS IN DANCE of the Department of Physical Education are offering a three-week workshop in modern dance, under the direction of Professor Elizabeth Burtner. The artist-in-residence will be Al Huang, assisted by Suzanne Pierce. This year, for the first time, a course in the Tao of Movement will be included in the workshop. A lecture-demonstration concert featuring the guest artist-in-residence and students from the repertory class will be presented in the Marvin Theatre at the end of the session. The workshop is open to both graduate and undergraduate students with previous experience in dance. From 1 to 4 semester hours of credit may be earned, or courses may be audited. Graduate credit in the program may be arranged.

Additional information may be obtained from Elizabeth Burtner, Professor Emeritus of Physical Education, Building J, George Washington University.

PHYSICAL EDUCATION

55 The Tao of Movement (1) — Huang

Study and exploration of T'ai Chi Chuan, the ancient Chinese meditative movement exercises. MTWThF 9:30–11 am.

57 Dance Technique I (1) — Pierce

Intermediate technique in modern dance. MTWThF 11:30 am–1 pm.

* Classes begin June 5. Registration June 5, 9 a.m. to 5 p.m., Bldg. K.

120 **Repertory** (1 or 2) Huang

Study and performance of dance works. Admission by permission of instructor. May be repeated three times for credit. MTWThF 2–3:30 pm.

123 **Advanced Dance Techniques** (1 or 2) Huang

Modern dance. May be repeated once for credit. MTWThF 11:30 am–1 pm.

High School Forensics Institute

THE DEPARTMENT OF SPEECH AND DRAMA will offer special programs for both high school teachers and students. Two programs are open to teachers. The first will focus on techniques and methods of training the student advocate; the second will explore in depth the 1972–73 National High School questions. These programs are designed to meet the needs of inexperienced coaches as well as those of more experienced teachers. The first program may be taken for credit as Sp&D 125, or in a noncredit status. The second program for teachers is noncredit only.

Selected high school students may enroll for college credit in Sp&D 126, Argumentation and Debate. Credit earned in the program may be used to meet degree requirements at George Washington University. Transfer of credit earned to another college or university is subject to the policies of that institution. All high school students accepted into the program will receive scholarships equal to one-third of the tuition for the course.

All programs will be under the direction of Professor Herbert L. James of Dartmouth College and Associate Professor William M. Reynolds of George Washington. A descriptive brochure may be obtained by writing to Professor George F. Henigan, Chairman, Department of Speech and Drama, George Washington University. (Teachers and students wishing to enroll for credit should also request an Application for Admission form.)

JUNE 19 TO JULY 14

SPEECH AND DRAMA

125 **Training the Student Advocate** (3)

In-depth investigation into the theory and practice of coaching competitive forensics-debate, oratory, and extemporaneous speaking. MTW ThF 9:45–12 am.

126 **Argumentation and Debate** (3)

Study of the advocacy system; special emphasis on issue identification, use of evidence, and logical proof. Extensive practice in argumentative speaking. Prerequisite: Sp&D 1 or permission of instructor. MTWThF 1:10–3:25 pm.

NONCREDIT WORKSHOPS

High school teachers electing noncredit status will register in the Department of Speech and Drama and pay fees indicated (which include University Center fee) directly to the Department. Admission to the University is not required.

JUNE 19 TO JULY 14

Training the Student Advocate

In-depth investigation into the theory and practice of coaching competitive forensics-debate, oratory, and extemporaneous speaking. Fee, $230.50. MTWThF 9:45–12 am.

JULY 31 TO AUGUST 11

Workshop on the National High School Proposition

Comprehensive study of bibliography, analysis, and casing, utilizing the unique research facilities of the nation's capital—libraries, government agencies, and independent research organizations—in addition to lectures on the topic by outstanding authorities in the field. Special individual work in developing approaches and cases for use in the Fall of 1972. Fee, $110. MTWThF 9:45–12 am.

Movement Workshop

JUNE 5 TO JUNE 9

THE PURPOSE OF THIS WORKSHOP is to extend the individual teacher's knowledge and ability to work with children in physical education. Three aspects will be included: basic movement experiences which serve as a foundation for the growth and development of children, application of basic movement skills to games and sports, observation of movement, and practice in the analysis of that movement.

In order to provide a broad viewpoint for study, outside specialists from the fields of early childhood and physical education will assist in the workshop. Outside field work and observation will be required in addition to regularly scheduled class meetings. From 1 to 3 semester hours of credit may be earned, or courses may be audited. Graduate credit in the program may be arranged. Additional information may be obtained from Jeanne Snodgrass, Associate Professor of Physical Education, Building K, George Washington University.

PHYSICAL EDUCATION

180 **Application of Movement Education to Sports** (1) Snodgrass and Staff
The refinement process and use of various basic movement skills in games and sports. MTWThF 6–8 pm.

181 **Analysis of Basic Movements for Children** (1) Snodgrass and Staff
Concentrated practice in observing basic human movement and critical analysis of basic skills such as running, jumping, kicking, striking, catching, and throwing. MTWThF 3:30–5:30 pm.

182 **Movement Education for Young Children** (1) Snodgrass and Staff
Foundational study of movement experiences which meet the needs of the young child. MTWThF 8–10 pm.

Russian-East Asian Studies

THE INSTITUTE FOR SINO-SOVIET STUDIES is offering a program of related courses focused on Russia, Eastern Europe, and East Asia. These courses are broad enough to have general appeal as electives for the liberal arts student and sufficiently specific to have vocational utility for the teacher of social studies. Regular faculty members will offer ten courses in this program, eight in the first session and two in the second. Each course carries 3 semester hours of credit. Students majoring in Political Science should consult with their advisers before registering for this work.

The following faculty will staff the courses in this program:

Franz Michael, *Professor of International Affairs and Far Eastern History*
Andrew Gyorgy, *Professor of International Affairs and Political Science*
Harold C. Hinton, *Professor of Political Science and International Affairs*
Vladimir Petrov, *Professor of International Affairs*
Charles F. Elliott, *Associate Professor of Political Science and International Affairs*
Richard C. Thornton, *Associate Professor of History*

FIRST SESSION—JUNE 12 TO JULY 19

HISTORY

138 **History of World Communism** (3) — Thornton
The international communist movement from its beginnings to the present. MTWThF 11:10 am–12:30 pm.

187 **History of Modern China** (3) — Michael
China since 1840, particular attention to political developments. MTWThF 9:40–11 am.

237 **Seminar: Soviet Foreign Policy, 1917–1953** (3) — Petrov
Revolutionary concept of diplomacy. Parallel instruments of foreign policy during the era of "capitalist encirclement," 1917-1939. From Nazi-Soviet partnership to the alliance with the West. Foreign policies of the cold war. TTh 6–8:40 pm.

387 **Readings in the History of Sino-Soviet Relations** (3) — Thornton
MWF 6:10–8 pm.

POLITICAL SCIENCE

101 **Far East in the Modern World** (3) — Michael
General character of Far Eastern societies and their response to the impact of America, Europe, and Russia; American policy in Far East and influence of world communism. MTWThF 8:10–9:30 am.

160 **Modern Communist Ideologies** (3) — Elliott
Intensive study of modern communism; emphasis on its antecedents and possible evolution. Careers and ideas of leading figures: Marx, Lenin, Stalin, Khrushchev, and Mao. MTWThF 4:10–5:30 pm.

163 **Soviet Foreign Policy** (3) — Elliott
Relations with United States, Third World, China; international communism; instruments of foreign policy; interrelationships of domestic and foreign policies; ideology and foreign policy. MTWTh 5:45–7:25 pm.

*194 **Governments of China and Japan** (3) Hinton

Institutions and processes of government in contemporary China and Japan, with some historical background. Attention to ideological forces. MTWThF 11:10 am–12:30 pm.

SECOND SESSION—JULY 20 TO AUGUST 25

HISTORY

396 **Readings in Modern Far Eastern History** (3) Staff

MWF 6:10–8 pm.

POLITICAL SCIENCE

†115 **Government and Politics in Eastern Europe** (3) Gyorgy

Study of the contemporary social and ethnic structures, governmental systems, and international position of the Eastern European states within the Soviet system. MTWThF 2:40–4 pm.

Secondary School Honors Program

THE OUTSTANDING SECONDARY SCHOOL STUDENT who wishes to enrich his academic background and participate in a stimulating introduction to college work is encouraged to seek admission to George Washington University's Secondary School Honors Program. The Honors Student is enrolled in regular college courses appropriate to his level of study, his background, and his aptitude as determined through consultation with his high school counselors and advisers at the University.

Since dormitory life is a vital part of the stimulating academic and cultural atmosphere of the campus and community, Honors Students are allowed to live in Thurston Hall, a modern, air-conditioned residence dormitory. Students from the immediate metropolitan area may commute, but they are encouraged to reside in the dormitory. Honors Students living in the dormitory are supervised by well-trained resident counselors. A varied extracurricular program focusing upon the unique location of the University in the nation's capital has been planned to complement both the academic and social life of the campus. Credit earned in the Program is applicable toward a degree at George Washington University should the student later matriculate here. The transfer of credit elsewhere depends upon the policies of the individual school to which the student might later apply.

All students admitted to the Program are appointed Scholars in the Secondary School Honors Program and receive scholarships for a five-week session. Resident students pay only $445, covering full tuition, board, and room. Commuting students receive an $83.50 scholarship for each 3- or 4-hour course. Laboratory fees and cost of books are not included in these scholarships. The program is designed to include a normal summer session of two courses.

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*Sc 162 and 194 are related in their subject matter, and credit for only one may be applied toward a degree.

†Sc 112, 115, and 161 are related in their subject matter, and credit for only one of the three may be applied toward a degree.

Since the Honors Program is limited to 100 secondary school students, admission is competitive. A transcript of the applicant's grades to date, available test scores, and evidence of emotional and intellectual maturity are criteria for admission.

Application forms and further information may be obtained from Mrs. Jean G. Wuckovich, Director of the Secondary School Honors Program, Division of University Students, George Washington University, Washington, D.C. 20006.

No applications will be considered after May 1.

Summer Institute in Israel

A SEVEN-WEEK PROGRAM—JULY–AUGUST

A SPECIAL PROGRAM IN ISRAEL involves the study of the role which the geography, culture, and history of Israel have played in the growth and development of Judaism, Christianity, and Islam. Special attention is given to the contributions of archeology, historical geography, history, and theology to the understanding of these religions. Field trips provide opportunity for study on historical sites. Instructors are Professor Robert G. Jones and Assistant Professorial Lecturer Martin S. Halpern.

Additional information may be obtained from Professor Robert G. Jones, Chairman, Department of Religion, George Washington University, Washington, D.C. 20006.

RELIGION

137	**The Land of Israel and the Growth of the Western Religions** (6)	Jones, Halpern

Summer Institute in Speech Pathology and Audiology

JUNE 19 TO JULY 21

THE SPEECH PATHOLOGY AND AUDIOLOGY section of the Department of Speech and Drama is offering a five-week Institute which will consider specific communications problems of the school-age child. The Institute will be divided into two courses of study in Speech Pathology and two in Audiology, running concurrently. The content of these courses is designed, through lectures, discussions, and demonstrations of current practices and procedures, to enhance the knowledge of professionals in the field of communication disorders. Each course will be supplemented with lectures and demonstrations by three nationally known authorities who will discuss a particular phase of the course content. A student may earn up to six semester hours of graduate credit during this Institute. He may elect to take all six hours in one discipline, or three in each. A prerequisite of three semester hours in the clinical management of speech and/or language disorders is required of those registering for the Speech Pathology course work, and three semester hours of basic principles and procedures in Audiology are required of those registering for Sp&D 292.

The following faculty will staff the courses in this program:
Lloyd S. Bowling, Sr., *Associate Professor of Speech and Hearing*
Joan R. Regnell, *Assistant Professor of Speech*
Joseph P. Fox, *Assistant Professor of Speech*
Diane M. Brewer, *Assistant Professor of Speech*

A descriptive brochure is available upon request from Lloyd S. Bowling, Director, Summer Institute in Speech Pathology and Audiology, Department of Speech and Drama, George Washington University, Washington, D.C. 20006.

SPEECH AND DRAMA

182 **Introduction to Audiology** (3) Bowling

Overview of the field of audiology to include a review of sound and its properties, anatomy and physiology of auditory system, and methods and procedures of pure tone and speech audiometry. Prerequisite: Sp&D 101, 171. MTWTh 2:50–4:30 pm.

277 **Advanced Clinical Procedures in Speech and Hearing** (3) Regnell

Language therapy for school children. Study of speech and language evaluation and therapy procedures in public schools based on modern linguistics concepts. Video-taped demonstrations. MTWTh 10:50 am–12:30 pm.

291A **Seminar: Speech Pathology** (3) Fox

A psycholinguistic model for speech and lanugage disorders. Presentation of a psycholinguistic model of communication based on transformational generative grammar theory and its application to the study of normal and abnormal speech and language behavior in children. May be repeated for credit. MTWTh 9–10:40 am.

292 **Seminar: Audiology** (3) Brewer

Principles and methods underlying identification and assessment of auditory disorders commonly found in hearing-handicapped school children. Methods for speech and language development, speech reading and auditory training of school-age children. Video-taped demonstrations. May be repeated for credit. MTWTh 1–2:40 pm.

Urban Ecology Workshop

ST SESSION—JUNE 12 TO JULY 19

ENVIRONMENTAL CRISIS in the Washington metropolitan area is the sub- of this interdisciplinary workshop. Under the direction of faculty mem- from various disciplines, the workshop is divided into teams which inves- e local environmental issues.

he workshop is open to both graduate and undergraduate students who d three classroom sessions and two field trips each week and may earn 4 ester hours of credit. An extra laboratory session on curricular materials les elementary and secondary school teachers in the workshop to earn 2 ional semester hours. Students wishing to enroll for graduate credit will equired to do extra work and will need the permission of both their aca- c dean and the instructor.

Additional information and application forms may be obtained by writing to Roderick French, Coordinator, Humanities Development Program, George Washington University, Washington, D.C. 20006.

Faculty teaching in this workshop will include
William E. Schmidt, *Professor of Chemistry*
John M. Logsdon, *Assistant Professor of Public Affairs and Political Science*
Roderick French, *Special Lecturer in American Studies*

EXPERIMENTAL HUMANITIES OR EDUCATION

196 **Urban Ecology Workshop** (4 or 6)

Legal, scientific, political, and ethical aspects of specific environmental issues in the Washington metropolitan area. MTW 9:40–11 am; ThF 9:40 am–12:30 pm.

Workshop in United States Foreign Policy

JULY 3 TO JULY 21

THE FOREIGN POLICY OF THE UNITED STATES is the subject of a three-week workshop for secondary school teachers in the social sciences. The session will focus on an intensive study of the formulation and execution of U.S. foreign policy, combining daily two-hour lecture-discussion periods with assignments utilizing the resources of the Department of State, congressional committees, department and agency staffs, the National Security Council, and other organizations, both public and private, concerned with foreign policy. Of special significance to the program will be critiques of U.S. foreign policy and comparative foreign policy problems provided by selected diplomatic officials from the major areas of the world.

Both morning and afternoon lecture-discussion sections will be offered, with the two groups combining for the utilization of outside resource personnel. Students enrolling in the course will be expected to complete a selected reading list before the first session of the class.

Additional information and application forms may be obtained by writing to Ralph E. Purcell, Professor of Political Science and International Affairs, Bldg. C, Room 627, George Washington University, Washington, D. C. 20006.

POLITICAL SCIENCE

267 **Seminar: U.S. Foreign Policy** (3)

Research and selected reading as the basis for an analysis of the foreign policy of the United States, with particular reference to the decision-making process and the execution of policy. Enrollment limited to teachers. Section A—Lecture and discussion, MTWThF 9:30–11:30 am; Section B—Lecture and discussion, MTWThF 1:30–3:30 pm. Conferences and field work as arranged.

COURSES OF INSTRUCTION

EXPLANATION OF COURSE NUMBERS

COLLEGES AND SCHOOLS OTHER THAN ENGINEERING AND APPLIED SCIENCE

First-group courses.—Courses numbered from 1 to 100 are planned for students in the freshman and sophomore years. With the approval of the adviser and the Dean, they may also be taken by juniors and seniors. In certain instances, they may be taken by graduate students to make up undergraduate deficiencies or as prerequisite to advanced courses, but they may not be taken for graduate credit.

Second-group courses.—Courses numbered from 101 to 200 are planned for students in the junior and senior years. They may be taken for graduate credit only upon the approval of the dean and the instructor at the time of registration. Such approval is granted only with the provision that students must complete additional work in order to receive graduate credit.

Third-group courses.—Courses numbered from 201 to 300 (in the Graduate School of Arts and Sciences, the School of Government and Business Administration, and the School of Public and International Affairs), courses numbered 201 to 400 (in the School of Education) are planned primarily for graduate students. They are open, with the approval of the instructor, to qualified seniors; they are not open to other undergraduates.

Fourth-group courses.—Courses numbered 301 to 400 in the Graduate School of Arts and Sciences are limited to graduate students, but they are primarily for doctoral candidates. Courses numbered 301 to 400 in the School of Government and Business Administration are limited to doctoral students. In the School of Education fourth-group courses, numbered 401 to 500, are limited to graduate students with Master's degrees from accredited institutions.

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

Courses numbered from 1 through 199 are planned for undergraduate credit, although certain courses may be taken for graduate credit when arrangements are approved in advance by the instructor and the Dean. Courses numbered 200 to 300 are planned for graduate credit and may in certain instances be taken by qualified undergraduate students. Courses numbered from 301 to 400 are primarily for doctoral students.

SEMESTER HOURS OF CREDIT

The number of semester hours of credit given for the satisfactory completion of a course is in most cases indicated in parentheses after the name of the course.

KEY TO ABBREVIATIONS

The following abbreviations are used in this catalogue for course designations.

Acct	Accounting	**Hist**	History
AmCv	American Civilization	**Jour**	Journalism
Anth	Anthropology	**Mgt**	Management Science
Ap S	Applied Science	**Math**	Mathematics
B Sc	Biological Sciences	**ME**	Mechanical Engineering
B Ad	Business Administration	**Mus**	Music
Chem	Chemistry	**OR**	Operations Research
Clas	Classics	**Phil**	Philosophy
CS	Computer Science	**PE**	Physical Education
Asia	East Asian Languages and Literatures	**Phys**	Physics
		P Sc	Political Science
Econ	Economics	**Psyc**	Psychology
Educ	Education	**P Ad**	Public Administration
EE	Electrical Engineering	**Rel**	Religion
E Ad	Engineering Administration	**Slav**	Slavic Languages and Literatures
Engl	English		
Hum	Experimental Humanities	**Soc**	Sociology
Fren	French	**Span**	Spanish
Geog	Geography and Regional Science	**S Ed**	Special Education
Geol	Geology	**Sp&D**	Speech and Drama
Germ	Germanic Languages and Literatures	**Stat**	Statistics
		U&RP	Urban and Regional Planning
HCA	Health Care Administration		

The Schedule of Classes for the Summer Sessions, which will be available in April at the Office of the Registrar, will contain information about room assignments and instructors for courses.

The University reserves the right to change or withdraw any of the following courses.

Accounting

A.J. Mastro, *Chairman*

1–2 **Introductory Accounting** (3–3)

A basic understanding of accounting concepts, procedures, analyses, and reports; the accounting measurement and communication of significant economic and financial data. Prerequisite to Acct 2: Acct 1. Students who have received credit for Acct 115 cannot receive credit for Acct 1–2. First Session: Acct 1—MTWTh 3:50–5:30 pm. Second Session: Acct 2—MTWTh 7:35–9:15 pm.

*115 **Survey of Financial Accounting** (3)

Development, presentation, and interpretation of financial accounting data necessary to the management process. Students who have received credit for Acct 1–2 cannot receive credit for Acct 115. First Session: Section A—MTWTh 5:45–7:25 pm. Second Session: Section C—MTWTh 5:45–7:25 pm.

121 **Intermediate Accounting** (3)

In-depth study of accounting functions and basic theory: acquisition of assets and services, income and equity accounting, preparation and analysis of financial statements. Prerequisite: Acct 1–2. First Session: MTWTh 5:45–7:25 pm.

193 **Business Budgeting** (3)

Principles and procedures in the development, installation, and operation of a system of budgetary control to aid management. Prerequisite: Acct 1–2. Students who have received credit for Acct 101 cannot receive credit for Acct 193. First Session: MTWTh 7:35–9:15 pm.

†215 **Survey of Managerial Accounting** (3)

Study of the nature, analysis, and interpretation of accounting reports, primarily from the management point of view. Prerequisite: Acct 1–2 or 115. Students who have received credit for Acct 101 cannot receive credit for Acct 215. Second Session: Section A—MWTh 6:10–8 pm.

299 **Thesis Seminar** (3)

First Session: As arranged.

300 **Thesis Research** (3)

Second Session.

merican Civilization

dministered by the American Studies Program. Bernard Mergen, *Director*

71–72 **Introduction to American Civilization** (3–3)

Themes and issues in American civilization since Colonial times, with emphasis on their contemporary importance. First Session: AmCv 71; Second Session: AmCv 72. MTWTh 5:45–7:25 pm.

271 **Seminar: Research and Teaching in American Civilization** (3)

Consideration of American studies as an area for research and teaching; introduction to bibliography. Required of candidates for the degree of Master of Arts in the field of American Civilization. First Session: As arranged.

295 **Independent Studies** (arr.)

Limited to Master's candidates. Permission of instructor, in writing, required. Both sessions.

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ecial section of this course, Acct 115B, for students in the Navy Graduate Financial Manage- Program, will be offered July 31 to September 1, hours to be arranged.
ecial section of this course, Acct 215B, for students in the Navy Graduate Financial Manage- Program, will be offered July 31 to September 1, hours to be arranged.

299–300 **Thesis Research** (3–3)
Both sessions.

398 **Advanced Reading and Research** (arr.)
Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Anthropology

R.L. Humphrey, Jr., *Chairman*

Departmental prerequisite: Anth 1–2 is prerequisite to all other courses in Anthropology except Anth 158 and 162. This prerequisite may be waived by permission of instructor.

1–2 **Introductory Anthropology** (3–3)
Anth 1: survey of man's origin, physical evolution, and culture history. Anth 2: survey of the world's cultures, illustrating the principles of cultural behavior. First Session: Anth 1; Second Session: Anth 2. MT WThF 9:40–11 am.

170 **Cultures of the Caribbean** (3)
Study of the culture history and ways of life of the various cultural groups of the area up to the ethnographic present. First Session: MTWThF 11:10 am–12:30 pm.

182 **New World Archeology** (3)
Survey of North American culture history from man's entry into the Americas during the Pleistocene period until the time of the first European contacts. Second Session: MTWThF 11:10 am–12:30 pm.

185 **Latin American Archeology** (3)
The culture history of pre-Columbian Mexico and Central America from the Paleo-Indian period through the Spanish Conquest, emphasizing the origin and development of Latin American high civilizations. First Session: MTWTh 7:35–9:15 pm.

295 **Research** (3)
May be repeated for credit. Both sessions.

299–300 **Thesis Research** (3–3)
Both sessions.

Applied Science

See "Engineering and Applied Science."

Art

L.P. Leite, *Chairman*

ART HISTORY AND THEORY

31–32 Survey of Western Art (3–3)

Survey of the arts in the Western world from prehistoric to modern times. A foundation for further study in the history of art. First Session: Art 31—MTWThF 1:10–2:30 pm. Second Session: Art 32—MTWThF 11:10 am–12:30 pm.

71–72 Introduction to the Arts in America (3–3)

Painting, sculpture, and architecture of America, with selected references to crafts and popular arts. Art 71: from Colonial beginnings to the Republican Age. Art 72: from early 19th century to the present. Second Session: Art 71—MTWThF 9:40–11 am: Art 72—MTWThF 8:10–9:30 am.

103 Classical Iconography (3)

Origin and development of myths in classical art. Second Session: MTWThF 11:10 am–12:30 pm.

105 Renaissance Art in Italy II (3)

High Renaissance and Mannerism. First Session: MTWThF 11:10 am–12:30 pm.

108 18th Century Art in Europe (3)

Development of painting, sculpture, and architecture. First Session: MTWThF 8:10–9:30 am.

109 19th Century Art in Europe (3)

Painting and sculpture. First Session: MTWThF 9:40–11 am.

110 Contemporary Art (3)

Painting and sculpture in 20th century Europe. Second Session: MTWThF 9:40–11 am.

111 Classical Archeology (3)

Archeological monuments of classical civilizations, with intensive study of one or more areas selected from architecture, sculpture, painting, or minor arts. Second Session: MTWThF 9:40–11 am.

114 Baroque Art in the North (3)

Development in painting, sculpture, and architecture in the 16th and 17th centuries in Holland, Flanders, Spain, France, Germany, and England. First Session: MTWThF 9:40–11 am.

115 Christian Iconography (3)

Origins and development of Christian symbols and themes from early Christian to modern times. Second Session: MTWThF 11:10 am–12:30 pm.

119 Pre-Romanesque Art in the North (3)

The Carolingian and Merovingian periods. First Session: MTWThF 1:10–2:30 pm.

120 **Art of China and Japan** (3)

Architecture, painting, and sculpture of China, Korea, and Japan. Second Session: MTWThF 1:10–2:30 pm.

FINE ARTS

Unless otherwise indicated, Fine Arts courses taught in University studios carry no material or laboratory fees; students must purchase their own materials. Laboratory and material fees for courses taught at the Corcoran School of Art are stated in the course description and are payable at the School.

Courses designated CSA are taught at the Corcoran School of Art. All other courses are taught in University studios.

Departmental prerequisite: Art 21–22 and 41–42, or permission of Department Chairman, are prerequisite to all other studio courses in Art.
Fine Arts Courses numbered 121 through 281 may be repeated for credit with approval of Department.

21–22 **Design I: Basic** (3–3)

Fundamental studies of principles and elements of design. Art 21: study of two-dimensional design. Art 22: three-dimensional studies. First Session: Art 21A (CSA)—MTWThF 1–4 pm; Art 21B—MTWThF 4:10–7:10 pm; Art 22A—MTWThF 9–12 am; Art 22B (CSA)—MTWThF 1–4 pm.

23 **Fundamentals of Photography** (3)
(Formerly Art 161)

Fundamental techniques of photography; emphasis on creative expression. Laboratory fee, $25, nonrefundable. First Session: Section A—lecture, MW 12–1 pm; laboratory section M, MTW 8–12 am; laboratory section N, MTW 1–5 pm. Section B (CSA)—lecture, W 12:30–1:30 pm; laboratory, MTW 1:30–6 pm. Section C (CSA)—lecture, Th 12:30–1:30 pm; laboratory ThFS 8 am–12:30 pm. Section D (CSA)—lecture, M 6–7 pm; laboratory, TWTh 6–9:30 pm and M 7–9:30 pm.

41–42 **Drawing I** (3–3) CSA

Concepts of drawing, traditional and contemporary; training in perception, analysis of form, use of media, and exercises in connoisseurship. First Session: Art 41A and 42A—MTWThF 9–12 am; Art 41B and 42B—MTWThF 1–4 pm; Art 41C and 42C—MTWThF 6:30–9:30 pm.

51–52 **Ceramics I** (3–3) CSA

Working with clay as an art form. Basic techniques of hand building and wheel throwing. Laboratory fee: Art 51, $40; Art 52, $40. First Session: Art 51A and 52A—MTWThF 1–4 pm; Art 51B and 52B—MTWThF 6:30–9:30 pm.

61 **Water Color** (3) CSA

Painting in transparent and opaque water color and in acrylic. Experimentation, figurative and landscape. First Session: MTWThF 9–12 am.

65–66 **Painting I** (3–3) CSA

Emphasis on personal expression with exposure to a variety of styles and attitudes. Use of acrylic and oils. First Session: Art 65A and 66A—MTWThF 9–12 am; Art 65B and 66B—MTWThF 6:30–9:30 pm.

81–82 **Sculpture I** (3–3) CSA

Three-dimensional design. Basic sculptural techniques; modeling, carving, and construction. Media include wood, clay, stone, plaster. Laboratory fee: Art 81, $20; Art 82, $20. First Session: Art 81 and 82—MTW ThF 9–12 am.

123 **Design II: Individual Problems** (3)

Emphasis on the individual student and the problems and materials that specifically interest him in any area of design. First Session: MTWThF 1–4 pm.

25–26 **Painting II** (3–3) CSA

Emphasis on personal expression; exposure to a variety of styles and attitudes. Materials and techniques subordinate to individual experimentation. Use of acrylics and oils. First Session: Art 125A and 126A—MTW ThF 1–4 pm; Art 125B and 126B—MTWThF 6:30–9:30 pm.

27–28 **Painting III** (3–3)

Exploration of problems in developing a personal visual imagery. First Session: Art 127A (CSA) and 128A (CSA)—MTWThF 1–4 pm; Art 127B (CSA) and 128B (CSA)—MTWThF 6:30–9:30 pm. Second Session: Art 127C—MTWThF 9–12 am; material and model fee for Art 127C, $12.

31–32 **Ceramics II** (3–3) CSA

Development of techniques with emphasis on quality and creativity. Laboratory fee: Art 131, $40; Art 132, $40. First Session: Art 131A and 132A—MTWThF 1–4 pm; Art 131B and 132B—MTWThF 6:30–9:30 pm.

137 **Workshop in Materials, Methods, and Techniques** (3)

Drawing in charcoal, crayon, and pen; painting and preparation of grounds for tempera, encaustic, fresco buono, oil, watercolor, polymer, and mixed techniques; graphic techniques in woodcut, engraving, etching. Material and model fee, $10. Second Session: MTWThF 1–4 pm.

3–44 **Serigraphy** (3–3)

Advanced problems in serigraphy; emphasis on its aesthetic possibilities. Prerequisite: Art 57–58. First Session: Art 143—MTWThF 9–12 am; Art 144—MTWThF 1–4 pm.

153 **Graphics II** (3)

Advanced relief, intaglio, and other composite processes. Prerequisite: Art 57–58. Material fee, $20. Second Session: MTWThF 9–12 am.

7–58 **Graphics III** (3–3)

Exploration of combined techniques and mixed media. Prerequisite: Art 153–54. First Session: Art 157A (CSA) and 158 (CSA)—MTWThF 9–12 am; laboratory fee for Art 157A and 158, $25 each. Second Session: 157B—MTWThF 1–4 pm.

159–60 **Drawing II** (3–3) CSA

Development of drawing. Individual study, application and extensions of drawing. First Session: Art 159 and 160—MTWThF 6:30–9:30 pm

179–80 **Sculpture II** (3–3) CSA

Concepts of sculpture; new materials and developments. Laboratory fee: Art 179, $20; Art 180, $20. First Session: Art 179 and 180—MTWThF 9–12 am.

189–90 **Sculpture III** (3–3) CSA

Advanced study concentrating on relevance of scale and media. Relationship of sculpture to the environment. Laboratory fee: Art 189, $20; Art 190, $20. First Session: Art 189 and 190—MTWThF 9–12 am.

205 **Advanced Photography** (3) CSA
(Formerly Art 191)

Advanced problems in photography; emphasis on individual development. Prerequisite: Art 162 or permission of instructor. Laboratory fee, $25. First Session: lecture M 12:30–1:30 pm, laboratory MTW 8 am–12:30 pm.

231 **Design III** (3)

New media and techniques in three-dimensional design. First Session: MTWThF 9–12 am.

265–66 **Painting IV** (3–3) CSA

Creative painting; students work on independent projects as well as assigned problems. First Session: Art 265A and 266A—MTWThF 1–4 pm; Art 265B and 266B—MTWThF 6:30-9:30 pm.

279–80 **Sculpture IV** (3–3) CSA

Laboratory fee: Art 279, $20; Art 280, $20. First Session: Art 279 and 280—MTWThF 9–12 am.

281 **Sculpture V** (3) CSA

Laboratory fee, $20. First Session: MTWThF 9–12 am.

Biological Sciences

A.H. Desmond, *Chairman*

Departmental prerequisite: B Sc 11–12 or equivalent is prerequisite to all second-group courses in Biology, Botany, and Zoology, except by permission of the instructor.

3–4 **Introductory Biology for Nonscience Majors** (3–3)

Survey of biological principles; emphasis on man as a functional organism in his environment. Material fee, $12 each session. First Session: B Sc 3; Second Session: B Sc 4. MTW 6–9 pm; Th 6–7 pm.

11–12 **Introductory Biology for Science Majors** (4–4)

Biological principles and problems designed to furnish a base for advanced studies in biology and related sciences. Material fee, $15 each

session. First Session: B Sc 11; Second Session: B Sc 12. MTWThF 9:40 am–1 pm.

127 **Genetics** (4)

Introductory course. Basic aspects of transmission of genetic traits with particular reference to the chemical basis of heredity and gene action. Material fee, $12. First Session: MTWThF 9:40 am–1 pm.

148 **Histology** (4)

Introduction to microscopical anatomy of normal tissues and organs with emphasis on the interrelationship of structure and function. Material fee, $12. First Session: MTWThF 6–8:50 pm.

163 **Human Physiology** (4)

Introduction to the function of organ systems of the human body. Material fee, $15. Second Session: MTWThF 6–9:20 pm.

171 **Undergraduate Research** (arr.)

Admission by permission of the staff member concerned. May be repeated for credit. Material fee, $15. Both sessions.

295 **Research** (arr.)

Investigation of special problems. May be repeated for credit. Both sessions.

299–300 **Thesis Research** (3–3)

Both sessions.

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Business Administration

R. Page, *Chairman*

101 **The Business Environment** (3)

Economic and legal environment of business enterprise; social and political influences; contemporary problems and issues. First Session: MTW ThF 1:10–2:30 pm.

102 **Fundamentals of Management** (3)

Planning, organizing, directing, coordinating, and controlling activities of the administrative unit; evolution of management thinking. Second Session: MTWTh 5:45–7:25 pm.

105 **Personnel Management** (3)

The labor force and labor markets. Industrial personnel and manpower programs, organizations and policy in personnel activities. First Session: MTWTh 5:45–7:25 pm.

131 **Business Finance** (3)

Analyzing capital requirements and methods of acquiring funds; planning efficient use of capital. Asset management, financial analysis, sources of funds, capital budgeting, stockholder relationships. Prerequisite: Acct 1–2; Econ 1; Math 30, 31; Stat 51. First Session: MTWThF 4:10–5:30 pm.

132 **International Business Finance** (3)

Principles, practices, problems, and institutions of international finance. Emphasis on international financial markets, exchange rates, balance-of-payments restraints, and governmental policies. Prerequisite: B Ad 131. First Session: MTWThF 4:10–5:30 pm.

138 **Investment and Portfolio Management** (3)

Theory and principles of security analysis and portfolio management, including analysis of the national economy, industry, company, and security markets. Risk-reward and computer-aided analysis. Prerequisite: Acct 1–2, B Ad 131. First Session: MTWThF 1:10–2:30 pm.

141 **Basic Marketing Management** (3)

Marketing and marketing management, consumer and demand analysis, retailing, wholesaling. Emphasis on major decision areas and tools. Prerequisite: Econ 1–2. First Session: MTWThF 4:10–5:30 pm.

161 **Commercial Law: Contracts, Sales, Agency, Bailments** (3)

Second Session: MTWTh 7:35–9:15 pm.

181 **Manufacturing Production** (3)

Basic principles and methods of manufacturing production. Manufacturing facilities, plant and equipment. Illustrations selected from various process and fabrication industries. Second Session: MTWThF 11:10 am–12:30 pm.

199 **Individual Research** (3)

Assigned topics. Admission by permission of adviser. May be repeated once for credit. Second Session: As arranged.

209 **Seminar: Personnel Management** (3)

Industrial personnel and manpower management, research in advanced problems. Second Session: MWF 4:10–6 pm.

231 **Financial Decision-making** (3)

Functions and objectives of financial management, asset management, problems of internal financial analysis, rate-of-return analysis, financial forecasting, problems of capital demand and supply. Prerequisite: Acct 115 or equivalent, B Ad 131. Second Session: MWF 8:10–10 pm.

233 **International Business Finance** (3)

Analysis of problems in international business finance. Impact of the evolving international payments system on business. Prerequisite: B Ad 131 or equivalent. First Session: MWF 1:10–3 pm.

237 **Investment Analysis** (3)

Risk-reward analysis of security investments including analysis of national economy, industry, company, and market; introduction to portfolio management; emphasis on theory and computer methods. Prerequisite: B Ad 131. First Session: MWF 6:10-8 pm.

241 Marketing Management (3)

Marketing management problems; market segmentation, product planning, channels of distribution, advertising, personal selling, sales promotion, pricing and development of integrated marketing programs. Second Session: MWF 6:10–8 pm.

255 International Trade (3)

Public and private foreign trade institutions; principles and theories of international trade; role of foreign trade and investment in U.S. balance of payments; problems and changing patterns in the Western Hemisphere. Second Session: MWF 6:10–8 pm.

257 Operation of the Multinational Firm (3)

International market entry and expansion; operating policies, procedures, and problems of multinational companies; developing executives for international business. Prerequisite: advanced Master's degree standing. First Session: MWF 6:10–8 pm.

259 Comparative Business Management (3)

Primarily for doctoral students. Comparative analysis of business practices and management in different countries and economic systems. Generic characteristics of management and of business enterprises and how these are modified in different environments. Influence on level of economic development, social structure, history, and culture of a country. Prerequisite: Mgt 201 or equivalent. First Session: MWF 6:10–8 pm.

260 Economics for Management (3)

For students in the Navy Graduate Financial Management Program only. Economic theory and its application in managerial decision-making; price theory, income and employment theory, related topics. Review of economic methodology. June 5 to July 28: As arranged.

265 Seminar: Managerial Economics (3)

Primarily for doctoral students. Special topics and applications of analytical tools to business decision-making and policy. Prerequisite: B Ad 261, 262; or permission of instructor. First Session: MWF 6:10–8 pm.

280 Procurement and Contracting (3)

Overview of procurement and contracting; emphasis on federal government buying policies, practices, and procedures. Second Session: MWF 6:10–8 pm.

283 Pricing and Negotiation (3)

Scope and objectives of negotiated procurement; preparation, conduct, and recording of negotiations; analysis of cost, price, profit, investment, and risk; cost principles; incentives; relationship of contract type to work requirements; techniques of negotiation. Prerequisite: B Ad 280 or permission of instructor. First Session: MWF 6:10–8 pm.

284 Procurement Data Management (3)

Technical data and the procurement process; contract-controlling documentation, patent rights, rights in data, requirements determination and the acquisition of data, federal policies, contractor interests. Configuration management; control of changes. First Session: MWF 4:10–6 pm.

298 **Readings in Business** (3)

Supervised readings in selected fields within business administration. Admission by permission of instructor. May be repeated once for credit. First Session: B Ad 298A; Second Session: B Ad 298B. MWF 4:10–6 pm.

299 **Thesis Seminar** (3)

Examination of thesis standards, research philosophy and methodology. First Session: As arranged.

300 **Thesis Research** (3)

Second Session.

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Business Administration general examination. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr).

Limited to Doctor of Business Administration candidates. May be repeated for credit. Both sessions.

Chemistry

C.R. Naeser, *Chairman*

11–12 **General Chemistry** (4–4)

A year course: credit toward a degree at this University given on completion of Chem 12. Elementary course in general chemistry, including qualitative analysis. Prerequisite: one year of high school algebra. Laboratory fee, $18 each session. First Session: Chem 11; Second Session: Chem 12. MWF 8:10 am–1 pm; TTh 8:10–11:10 am.

51–52 **Organic Chemistry** (3–3)

A year course: credit toward a degree at this University given on completion of Chem 52. Chemistry of the compounds of carbon. Prerequisite: Chem 12 or 16. First Session: Chem 51; Second Session: Chem 52. MTWThF 8:10–9:40 am.

53–54 **Organic Chemistry Laboratory** (1–1)

Laboratory complement of Chem 51–52. Prerequisite or concurrent registration: Chem 51–52. Prerequisite to Chem 54: Chem 53. Laboratory fee, $12 each session. First Session: Chem 53; Second Session: Chem 54. MWF 9:50 am–1 pm.

110 **Introduction to Physical Chemistry** (3)

Topics include chemical thermodynamics, chemical kinetics, electrochemistry, solution chemistry, membrane and phase equilibria, and others. Not open to chemistry majors. Prerequisite: Chem 16 or 22; Math 31; Phys 2; or permission of instructor. May not be taken for credit by students who have received credit for Chem 111–12 or an equivalent course. A 6-week course, June 12 to July 26: MTWThF 6–7 pm.

295 **Research** (arr.)

Research on problems approved by the staff. Open to qualified students with advanced training. May be repeated for credit not to exceed a total of 8 semester hours. Laboratory fee, $7.50 a semester hour. Both sessions.

299–300 **Thesis Research** (3–3)

Laboratory fee, $18 each session. Both sessions.

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy cumulative examinations. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

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e "East Asian Languages and Literatures."

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hn E. Ziołkowski, *Chairman*

URSES IN ENGLISH TRANSLATION

64 **Greek and Latin Origins of English Words** (3)

Study of Greek and Latin roots in English to improve vocabulary and facilitate understanding of the language of science, philosophy, politics, etc. First Session: MTWThF 9:40–11 am.

72 **Greek and Roman Poetry, Philosophy, and Satire** (3)

Survey of major lyric and dramatic poets (including Sophocles, Euripides, Aristophanes); philosophers (Plato, Aristotle), and satirists (Juvenal, Petronius, Apuleius). Students who receive credit for Clas 105 cannot receive credit for Clas 72. First Session: MTWThF 11:10 am–12:30 pm.

105 **Survey of Classical Humanities** (3)

Representative masterpieces of Greek and Roman literature: epic, lyric, dramatic, philosophical, and historical. Students who receive credit for Clas 71 or 72 cannot receive credit for Clas 105. Second Session: MTWThF 9:40–11 am.

108 **Classical Mythology** (3)

Mythology of the Greeks and Romans from the creation of the world: tales of the gods, heroes, and great families that have influenced literature, art, and music. Second Session: MTWThF 11:10 am–12:30 pm.

Computer Science

See "Engineering and Applied Science."

East Asian Languages and Literatures

Chung-wen Shih, *Acting Chairman*

CHINESE

5–6 **Beginning Intensive Mandarin Chinese, Levels I–II** (6–6)

Intensive beginners' course in fundamentals of grammar and pronunciation with graded reading and practice in writing. Prerequisite to Asia 6: Asia 5 or 2. Laboratory fee, $17.50 each session. June 12 to July 14: Asia 5*; July 17 to August 18: Asia 6. Classroom—MTWThF 9–11:45 am, tutorial—MTWThF 12:45–1:35 pm, laboratory—MTWThF 1:45–2:35 pm.

Economics

Henry Solomon, *Chairman*

Departmental prerequisite: Econ 1–2 is prerequisite to all other courses in Economics.

1–2 **Principles of Economics** (3–3)

Survey of the major economic principles, institutions, and problems in contemporary life. Econ 1 is prerequisite to Econ 2. First Session: Econ 1 Section A—MTWThF 9:40–11 am, Section B—MTWTh 5:45–7:25 pm. Second Session: Econ 1 Section C—MTWThF 1:10–2:30 pm; Econ 2 Section A—MTWThF 1:10–2:30 pm, Section B—MTWTh 5:45–7:25 pm.

101 **Intermediate Microeconomic Theory** (3)

Analysis of supply, demand, and pricing. First Session: MTWTh 5:45–7:25 pm.

102 **Intermediate Macroeconomic Theory** (3)

Theories of national income determination and growth. First Session: MTWThF 11:10 am–12:30 pm.

121 **Money and Banking** (3)

Nature of money, credit, commercial banking, and the other financial institutions in the U.S. monetary system. Second Session: MTWTh 5:45–7:25 pm.

* Students register for Asia 6 on June 12.

181–82 **International Economics** (3–3)

Econ 181: international trade theory and international monetary theory. Econ 182: continuation of international monetary theory; economic development. First Session: Econ 181—MTWThF 11:10 am–12:30 pm. Second Session: Econ 182—MTWTh 5:45–7:25 pm.

217–18 **Survey of Economics** (3–3)

For graduate students in fields other than Economics. Econ 217: price theory. Econ 218: income and employment theory. Departmental prerequisite waived. First Session: Econ 217—MWTh 6:10–8 pm; Econ 218—TThF 9:10–11 am.

265 **Industrial Organization** (3)

(Formerly Economics of Regulatory Policy)

Structure and performance of the American economy; emphasis on the economics of antitrust policy and the impact of government regulatory practices. First Session: MWTh 6:10–8 pm.

299–300 **Thesis Research** (3–3)

First Session: Econ 299–300. Second Session: Econ 300.

*378 **Seminar: Topics in Econometrics** (3)

Limited to graduate students, primarily for doctoral candidates. A research seminar covering current econometric literature and special topics. Admission by permission of instructor. Second Session: MWTh 6:10–8 pm.

390 **Seminar: International Economic Theory** (3)

Limited to graduate students, primarily for doctoral candidates. Examination of recent contributions in this field. First Session: MWTh 6:10–8 pm.

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

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G. Detwiler, *Chairman*

partmental prerequisite: a degree from an accredited institution is prerequisite to all third-group courses in Education. Adequate professional paration is prerequisite to all third-group courses in Education except for se courses limited to students in the M.A.T. Program.

See also courses in Physical Education, pages 80–81, and in Special Education, pages 93–96.

* Interdepartmental course offered by the departments of Economics and Statistics.

FIRST SESSION—JUNE 12 TO JULY 19

108 **Human Development, Learning, and Teaching** (3)

Principles of effective teaching based on an understanding of human development and the nature of learning. Prerequisite: Psyc 22; Psyc 29 or 112. Lecture MW 6:40–9 pm; conference MW 6–6:40 pm; three hours field work each week.

123 **Society and the School** (3)

Historical and social development of education, contemporary issues, cooperation of the school with other community agencies, functions of school personnel. TTh 6:40–9 pm; conference 6–6:40 pm.

*196 **Urban Ecology Workshop** (6)

Lecture MTW 9:40–11 am and ThF 9:40 am–12:30 pm; laboratory as arranged. (See Urban Ecology Workshop, pages 39–40.)

261 **Practicum in Guidance** (3)

Supervised experience in counseling and guidance. Prerequisite: 12 semester hours in counseling and guidance. Admission by permission of Department Chairman. MTWThF 1:10–3 pm.

336 **Practicum in Reading** (3)

As arranged.

FIRST 3-WEEK WORKSHOP SESSION—JUNE 12 TO 30

Classes meet Monday through Friday. Each workshop course requires the full day; concurrent registration for another daytime course is not permitted. June 13 to 16—small group discussions, evening; June 19 to 30—small group discussion and field work, afternoon.

112A **Educational Measurement** (3)

Scope, needs, services to students, selection and construction of teacher-made tests, interpretation of tests for evidence purposes. Prerequisite: Educ 108 and 123. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 10:10–12 am; conference 9:10–10 am.

209 **Child Development** (3)

Interdisciplinary approach to child development. Analysis, interpretation, and practical implications for instruction of research in disciplines contributing to a knowledge of child development. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 10:10–12 am; conference 9:10–10 am.

219 **Elementary School Classroom Procedures** (3)

Current theories of teaching and learning and their application to teaching acts and strategies of elementary school teachers. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 10:10–12 am; conference 9:10–10 am.

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* Offered jointly by the Office of Program Development and the Department of Education. Hum 196 does not have a laboratory session; therefore students receive a maximum of 4 semester hours of credit for this course. Educ 196 has a laboratory session on curricular materials for elementary and secondary school teachers; therefore teachers receive 2 additional hours of credit for a total of 6 semester hours for this course.

245 **School and Community** (3)

The school as an important member of a team of social agencies that builds the community. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 10:10–12 am; conference 9:10–10 am.

251 **Foundations of Guidance and Personnel Services** (3)

Introductory survey: definitions, scope, principles, historical background, organization, services, emerging trends, and issues. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 8:10–10 am; conference 10:10–11 am.

255 **Secondary Education** (3)

Current proposals for improvement of secondary education. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 10:10–12 am; conference 9:10–10 am.

257 **Educational and Occupational Development** (3)

Theories of career development; factors influencing the world of work; procedures for evaluating and using socio-personal, educational, and occupational information. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 10:10–12 am; conference 9:10–10 am.

259 **Secondary School Administration** (3)

For experienced teachers and administrators. Survey of administration including practices of the modern high school. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 10:10 to 12 am; conference 9:10–10 am.

316 **Curriculum Developments in Elementary School Social Studies** (3)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school social studies curriculum. Admission by permission of instructor. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 8:10–10 am; conference 10:10–11 am.

320 **Curriculum Developments in Elementary School Mathematics** (3)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school mathematics curriculum. Admission by permission of instructor. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 8:10–10 am; conference 10:10–11 am.

380 **Sensitivity Training: Laboratory Method** (3)

A sensitivity learning experience in human relations using unstructured group experience, individual feedback, experimentation, and practice. Admission by permission of Department, prior to registration. June 12 to 23: lecture and laboratory 9:10–12 am and 1:10–5 pm. June 26 to 30: individual projects as assigned and conference.

Geog 51B **Introduction to Geography** (3)

General survey of the various systematic, physical, and human fields of geography which play a role in the analysis and interpretation of man-environment relationships in both spatial and ecological contexts. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 10:10–12 am; conference 9:10–10 am.

Psyc 22A **Introduction to Educational Psychology** (3)

The contributions of psychology to education, with special emphasis on learning. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 10:10–12 am; conference 9:10–10 am.

SECOND 3-WEEK WORKSHOP SESSION—JULY 3 TO JULY 21

Classes meet Monday through Friday. Concurrent registration for another daytime course is not permitted, because each workshop course requires the full day—lecture and conference in the morning; small group discussion and field work in the afternoon.

*115 **Elementary School Teaching of Reading** (3)

Introduction to methods, techniques, materials, and activities essential to a good elementary school reading program. Prerequisite: Educ 108 and 123, or teaching experience. Lecture 10:10–12 am; conference 9:10–10 am.

201 **Seminar: International Education** (3)

For elementary school teachers. Survey of selected foreign educational systems and cultures. Research, techniques, and materials to develop world-mindedness. Embassy resources utilized. Lecture 9:10–11 am; conference 11:10–12 am.

207 **Curriculum Materials** (3)

For experienced teachers. Construction of courses of study and classroom teaching aids, with direct application to students' situations. Lecture 8:10–10 am; conference 10:10–11 am.

223 **Foundations of Reading Instruction** (3)

Historical and psychological background; evaluation of recent methods, materials, and techniques in teaching reading; demonstrations of diagnostic and teaching techniques. Lecture 10:10–12 am; conference 9:10–10 am.

243 **Human Relations in Education** (3)

Principles and practices in human relations between and among learner, teacher, other school personnel, and parents. Lecture 10:10–12 am; conference 9:10–10 am.

253 **Analysis of the Individual for Purposes of Counseling** (3)

Detailed study of individual analysis and appraisal techniques. Development of systematic case study. Prerequisite: Educ 112 or equivalent. Lecture 10:10–12 am; conference 9:10–10 am.

256 **Secondary Education** (3)

Current problems in each subject-matter field. Lecture 8:10–10 am; conference 10:10–11 am.

285 **Student Activities** (3)

Nature and purposes of selected activities—homeroom, clubs, assemblies, school publications, student council, interscholastic contest; attention to sponsorship, participation, finance, and evaluation. Lecture 10:10–12 am; conference 9:10–10 am.

* This course may not be taken by students who have completed or plan to enroll in Educ 111.

341 **Cognitive Models and Instructions** (3)

Cognitive models (Guilford, Piaget, etc.) are analyzed as the theoretical basis for planning instructional episodes appropriate at various levels—childhood through young adulthood. Lecture 10:10–12 am; conference 9:10–10 am.

354 **Counseling of Minority Groups** (3)

Consideration of problems and approaches related to counseling cultural and racial minorities in American society; emphasis on counseling the disadvantaged in urban areas. Lecture 10:10–12 am; conference 9:10–10 am.

375 **Foundations of a College Student Development Program** (3)
(Formerly Introduction to Student Personnel Work)

College student development as an integral part of higher education programs. Lecture 10:10–12 am; conference 9:10–10 am.

P Sc 267 **Seminar: U.S. Foreign Policy** (3)

Enrollment limited to teachers. Section A—lecture and discussion 9:30–11:30 am; Section B—lecture and discussion 1:30–3:30 pm. Conferences and field work as arranged. (See Workshop in United States Foreign Policy, page 40.)

IX-WEEK SESSION—JULY 3 TO AUGUST 11

112B **Educational Measurement** (3)

This special section of Educ 112 is limited to students in the M.A.T. program. Scope, needs, services to students, selection and construction of teacher-made tests, interpretation of tests for evidence purposes. Prerequisite: Educ 108 and 123. As arranged.

113 **Elementary School Art** (3)

For undergraduates in the elementary school curriculum. Materials and methods. Material fee, $5. TTh 6–9 pm.

153 **Early Childhood Classroom Management** (3)

Admission by permission of instructor. TTh 6:40–9 pm; conference 6–6:40 pm.

220 **Elementary School Teaching Foundations** (9)

Limited to M.A.T. students. Introductory block course dealing with the content of professional education courses: history and philosophy of education; educational psychology, human development, learning, and teaching; society and the school; elementary school organization. 160 class hours supplemented by field experience. MTWThF 9–12 am; field work 1–4 pm.

229 **Administration of Elementary Education** (3)

For experienced teachers and administrators. Achieving instructional objectives, organizing and servicing teaching activities, coordinating school and community life. TTh 1–3:20 pm; conference MWF 1–2 pm.

233 **Audio-visual Education** (3)

Selection, evaluation, and use of audio-visual materials: administrative problems in care, operation, maintenance, and use of such materials and equipment. Material fee, $7. MW 6:40–9 pm; two conference hours as arranged.

271 **The Teacher and School Administration** (3)

Role of federal, state, and local administrative units; school finance; legal controls; school plant; public support; improving teaching conditions. TTh 4:10–6 pm; two conference hours as arranged.

278 **School Law** (3)

Sources and scope of school law; legal rights and responsibilities of teachers, pupils, and taxpayers. Other legal problems of major interest to the group. MW 6:40–9 pm; two conference hours as arranged.

284 **Administration of Higher Education** (3)

Government, organization, and administration of colleges and universities; duties of trustees and administrators. TTh 6:40–9 pm; two conference hours as arranged.

293–94 **Research and Independent Study** (3–3)

Individual research under guidance of a staff member. Program and conferences arranged with an instructor.

295 **Research Methods and Procedures** (3)

Required of all candidates for graduate degrees in Education. To be taken early in the graduate program. Section A: TTh 1:10–3:30 pm; two conference hours as arranged. Section B: MW 3:40–6 pm; two conference hours as arranged. Section C: MW 6:40–9 pm; two conference hours as arranged. Section D: TTh 6:40–9 pm; two conference hours as arranged.

296 **Seminar: Educational Research** (3)

Analysis of scientific approaches to problems in education and evaluation of the application of research techniques. Required of all candidates for the Ed.D. degree. Prerequisite: Educ 295 and Stat 105; or equivalent. MW 3:40–6 pm; two conference hours as arranged.

297 **Personnel Administration** (3)

Organization and administration of personnel programs for educational institutions. Basic philosophy, principles, responsibilities, and functions. TTh 6:40–9 pm; two conference hours as arranged.

299–300 **Thesis Research** (3–3)

Required of Master of Arts in Education candidates writing Master's theses.

301 **Data Processing in Education** (3)

Machine accounting and computer technology for counselors, teachers, and administrators. TTh 6:40–9 pm; two conference hours as arranged.

333 **Early Childhood Classroom Management** (3)

Lecture and field. Planning, reporting, records, equipment, testing, working with parents and aides. TTh 6:40–9 pm; conference 6–6:40 pm.

THIRD 3-WEEK WORKSHOP SESSION—JULY 24 TO AUGUST 11

Classes meet Monday through Friday. Concurrent registration for another daytime course is not permitted, because each workshop course requires the full day—lecture and conference in the morning; small group discussion and field work or laboratory in the afternoon.

114 **Elementary School Music** (3)

For undergraduates in the elementary school curriculum. Program of music activities essential to basic musical understanding. Materials and techniques. Lecture 10:10–12 am; conference 9:10–10 am.

128 **Children's Literature** (3)

Newer books for children and the children's classics, contribution of literature to child development, children's original expressions. Lecture 8:10–10 am; conference 10:10–11 am.

208 **Human Development** (3)

Contribution of various disciplines to an understanding of human development throughout the life span; emphasis on practical implications of relevant research. Lecture 10:10–12 am; conference 9:10–10 am.

231 **Secondary School Classroom Procedures** (3)

Current classroom practices: teacher-pupil planning, group procedures, initiatory and culminating activities, individual and group evaluation techniques, teaching aids, etc.; review of recent literature. Lecture 8:10–10 am; conference 10:10–11 am.

258 **Techniques of Counseling** (3)

Theories and practices of vocational, educational, and personal counseling. Prerequisite: 12 semester hours in guidance and counseling, including Educ 253 and 257. Lecture 10:10–12 am; conference 9:10–10 am.

272 **The Teacher and School Supervision** (3)

Nature, organization, human relationships, and techniques. Lecture 10:10–12 am; conference 9:10–10 am.

317 **Curriculum Developments in Elementary School Science** (3)

For experienced educational personnel. Research, techniques, materials, and innovative programs relating to the effective elementary school science curriculum. Admission by permission of instructor. Lecture 8:10–10 am; conference 10:10–11 am.

342 **Language Development** (3)

Nature of language development; role of langauge in the socialization process. Lecture 10:10–12 am; conference 9:10–10 am.

357 **Mental Hygiene** (3)

Mental health problems; emphasis on needs of counselors, teachers, and others working with children and adolescents. Lecture 10:10–12 am; conference 9:10–10 am.

376 **College Student Development and Campus Groups** (3)
(Formerly Student Personnel Work with College Groups)

Principles and procedures of student development programs with campus groups; campus group activities and development of student leadership. Lecture 10:10–12 am; conference 9:10–10 am.

Electrical Engineering

ee "Engineering and Applied Science."

Engineering Administration

See "Engineering and Applied Science."

Engineering and Applied Science

APPLIED SCIENCE

Ap S 59, 113, and 211 are administered by the Department of Civil, Mechanical, and Environmental Engineering, A.M. Freudenthal, *Chairman*.
Ap S 115 is administered by the Department of Operations Research, W.H. Marlow, *Chairman*.

59 **Introductory Analytical Mechanics** (4)

Kinematics, statics, and dynamics of a particle, statics and dynamics of systems of particles, kinematics of a rigid body, geometrical and inertial parameters of rigid bodies, statics and dynamics of rigid bodies and beams. Introduction to Lagrangian-Hamiltonian formulation. Prerequisite: Ap S 113; Phys 31. First Session: MTWThF 4:10–5:50 pm.

113 **Engineering Analysis I** (3)

Analytical methods appropriate to the solution of engineering problems. Mathematical topics include matrices and linear algebra; ordinary differential equations, vector calculus, and integral theorems; complex algebra. Prerequisite: Math 32. Second Session: MTWThF 4:10–5:30 pm.

115 **Probabilistic and Statistical Methods in Engineering** (3)
(Formerly E Ad 115)

Solution of engineering problems using sets and functions; probability models; distributions and functions; statistical concepts and methods, including hypothesis testing, correlation, and regression. Prerequisite: Math 32. An 8-week course—June 12 to August 4: MW 3:10–5:40 pm.

211 **Mathematical Methods in Applied Science I** (3)

Introduction to theory of finite and infinite dimensional vector spaces, generalized Fourier series, completeness property. Tensor calculus, curvilinear coordinates. Prerequisite: approval of Department. First Session: MTWThF 4:10–5:30 pm.

COMPUTER SCIENCE

Administered by the Department of Electrical Engineering and Computer Science, W.K. Kahn, *Chairman*.

EIGHT-WEEK COURSES—JUNE 12 TO AUGUST 4

298 **Research** (arr.)

Research as arranged. May be repeated for credit.

299–300 **Thesis Research** (3–3)

398 **Dissertation Research** (arr.)
Limited to Doctor of Science candidates. May be repeated for credit.

ELECTRICAL ENGINEERING

Administered by the Department of Electrical Engineering and Computer Science, W.K. Kahn, *Chairman.*

EIGHT-WEEK COURSES—JUNE 12 TO AUGUST 4

198 **Research** (1 to 3)
Applied research and experimentation projects, as arranged. Prerequisite: junior or senior status.

298 **Research** (arr.)
Research as arranged. May be repeated for credit.

299–300 **Thesis Research** (3–3)

399 **Dissertation Research** (arr.)
Limited to Doctor of Science candidates. May be repeated for credit.

ENGINEERING ADMINISTRATION

P.A. Crafton, *Chairman*

EIGHT-WEEK COURSES—JUNE 12 TO AUGUST 4

170 **Basic Quantitative Methods for Engineering Administration** (3)
An introductory treatment of quantitative tools and techniques important in administration with emphasis on their application. Concepts of probability and decision-making in administrative decisions. TTh 3:10–5:40 pm.

211 **Engineering Administration I** (3)
Comprehensive and systematic study of the administrative process with emphasis on industrial, scientific, and engineering environments. Planning: objectives, prediction, policies, plans and characteristics of plans. Organizing: theory of organization, structure, authority, specialization, delegation, staff and committees. MW 3:10–5:40 pm.

269 **Elements of Decision-making and Problem-solving** (3)
History and orientation of quantitative methods; concept of quantitative decision-making; decision criteria under certainty, risk, and uncertainty; game theory; utility; the time factor; replacement models. Prerequisite: E Ad 170 or equivalent. TTh 6:10–8:40 pm.

297 **Problems in Engineering Administration** (3)
Project course providing the student with the opportunity to apply the various concepts and tools previously studied to the solution of a problem in Engineering Administration. Students will work individually or in small groups, each on a problem proposed by the student and approved by the instructor. MW 6:10–8:40 pm.

MECHANICAL ENGINEERING

Administered by the Department of Civil, Mechanical, and Environmental Engineering, A.M. Freudenthal, *Chairman*.

131 **Thermodynamics** (3)

Fundamental thermodynamic concepts from classical and statistical viewpoints; thermal equilibrium and temperature; the first law of thermodynamics, energy analysis of thermodynamic systems. Approach to equilibrium entropy and the second law of thermodynamics, analysis of thermodynamic systems. Prerequisite: Ap S 59. Second Session: MT WThF 4:10–5:30 pm.

OPERATIONS RESEARCH

W.H. Marlow, *Chairman*

EIGHT-WEEK COURSE—JUNE 12 TO AUGUST 4

201 **Survey of Operations Research Methods I** (3)
(Formerly E Ad 270)

Basic concepts and techniques of operations research as applied to problems in industrial, governmental, and military decision-making. Allocation models including the simplex procedure of linear programming, transportation and assignment models, queuing theory, inventory theory, game theory, and decision-making under uncertainty. Prerequisite: Ap S 115 or equivalent. TTh 3:10–5:40 pm.

English

G.E. McCandlish, *Chairman*

Students whose College Board English Composition Achievement Test scores suggest inadequate preparation may be assigned to Engl 1*x* or may be tested in vocabulary, spelling, grammar, standard usage, and writing skill, before placement in either Engl 1*x* or 1. Students whose scores and/or writing skill indicate superior competence will be allowed to waive Engl 1; those whose scores indicate markedly superior competence will be allowed to waive both Engl 1 and Engl 2 or 4.

Departmental prerequisite: Engl 1 or 1*x* is prerequisite to all other courses in English. A 6-semester-hour course in literature, or equivalent, or written permission of the instructor, is prerequisite for admission to all second-group courses in English except Engl 115 and 161–62.

ENGLISH COMPOSITION

A **English for Foreign Students** (3)

Reading and writing to assist the foreign student in overcoming deficien-

cies in the use of English. Special attention to spelling, syntax, grammar, idiom, and vocabulary. First Session: MTWTh 5:45–7:25 pm.

B **English for Foreign Students** (3)

For second-semester foreign students not ready for Engl 1. Writing of expository paragraphs and themes; outlining; reading for comprehension, vocabulary, and style. First Session: MTWTh 7:35–9:15 pm.

1 **English Composition: Language as Communication** (3)

Study and practice of expository techniques with emphasis on the rhetorical complexities of unity, development, organization, and coherence, by analysis of selected current books; library research procedure. First Session: MTWThF 11:10 am–12:30 pm.

2 **English Composition: Language and the Arts and Sciences** (3)

Study and practice of expository and argumentative techniques; emphasis on the rhetorical complexities of the sentence and of diction, and on logical thought, by analysis of selected books on the nature of language and of the arts and sciences. Prerequisite: Engl 1 or 1*x*. Students who receive credit for Engl 2 cannot receive credit for Engl 4. Second Session: MTWThF 9:40–11 am.

4 **English Composition: Language in Literature** (3)
(Formerly Engl 40)

Study and practice of expository and argumentative techniques through critical writing; emphasis on the rhetorical complexities of stylistics in the sentence and in diction, and on logical thought, by the study of literary genres and of the use of language in literature. Prerequisite: Engl 1 or 1*x*. Students who receive credit for Engl 4 cannot receive credit for Engl 2. Second Session: MTWThF 11:10–12:30 pm.

ENGLISH LITERATURE

51–52 **Introduction to English Literature** (3–3)

Historical survey. Prerequisite: Engl 1 or 1*x*. First Session: Engl 51; Second Session: Engl 52. MTWThF 9:40–11 am.

116 **Medieval Legend and Saga** (3)

Celtic and Norse. First Session: MTWTh 5:45–7:25 pm.

117 **English Poetry: Form and Content** (3)

Medieval period to the 20th century. First Session: MTWThF 9:40–11 am.

123 **Principles of Literary Criticism** (3)

First Session: MTWThF 1:10–2:30 pm.

126 **Elizabethan Verse and Prose** (3)

Detailed study of major writers and genres. Second Session: MTW ThF 1:10–2:30 pm.

128 **Shakespeare** (3)

Second Session: MTWThF 4:10–5:30 pm.

137 **The 20th Century** (3)

British poetry and criticism since 1900. First Session: MTWThF 4:10–5:30 pm.

154 **The English Novel** (3)

Major novelists, 19th century. Second Session: MTWThF 1:10–2:30 pm.

AMERICAN LITERATURE

71–72 **Introduction to American Literature** (3–3)

Historical survey. Engl 71: from beginnings to the Civil War. Engl 72: from the Civil War to present. Prerequisite: Engl 1 or 1x. First Session: Engl 71; Second Session: Engl 72. MTWThF 9:40–11 am.

163–64 **Major American Poets** (3–3)

Advanced critical study of significant writers and movements. Engl 163: from beginnings through the 19th century. Engl 164: the 20th century. First Session: Engl 163; Second Session: Engl 164. MTWThF 11:10 am–12:30 pm.

170 **The American Short Story** (3)

Historical development of the short story in America. Second Session: MTWThF 1:10–2:30 pm.

171 **Major American Writers** (3)

First Session: MTWTh 5:45–7:25 pm.

175 **Special Topics in American Literature** (3)

Topic for summer: Black literature. For undergraduate credit only. First Session: MTWThF 1:10–2:30 pm.

177 **Contemporary American Literature** (3)

First Session: MTWThF 1:10–2:30 pm.

268 **Seminar: American Fiction** (3)

William Faulkner. Second Session: MWTh 6:10–8 pm.

Experimental Humanities

Administered by the Office of Program Development, C.C. Mondale, *Director*

101–2 **Supervised Work-Study** (6–6)

Work commitments in municipal agencies or community organizations; study projects supervised by appropriate faculty. Juniors and seniors admitted by permission of instructor. Prerequisite to Hum 102: Hum 101. Both sessions: Hum 101 and 102, as arranged.

*196 **Urban Ecology Workshop** (4)

First Session: MTW 9:40–11 am; ThF 9:40 am–12:30 pm. (See Urban Ecology Workshop, pages 39–40.)

French

Administered by the Department of Romance Languages and Literatures, J.F. Burks, *Chairman*

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

Departmental prerequisite: Fren 3–4 or 6, or equivalent, is required as prerequisite to all second-group courses in French.

1–2 **First-year French** (3–3)

A year course: credit toward a degree at this University given on completion of Fren 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern French prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a session. First Session: Fren 1; Second Session: Fren 2. Classroom—MTWThF 9:40–11 am, laboratory—MTh 11:10–12 am.

3–4 **Second-year French** (3–3)

A year course: credit toward a degree at this University given on completion of Fren 4. Conversation, grammar, composition, reading in modern French prose, introduction to French civilization. Aural training, oral practice in language laboratory. Prerequisite: Fren 1–2, 2*x*, or two years of high school French. Laboratory fee, $17.50 a session. First Session: Fren 3; Second Session: Fren 4. Classroom—MTWThF 11:10 am–12:30 pm, laboratory—MTh 10:10–11 am.

12 **French Conversation and Composition (Intensive)** (6)

Intensive course which covers material of Fren 9–10. Two class meetings and one laboratory meeting every day. Laboratory fee, $25. First Session: classroom—MTWThF 9:40–11 am and 1:10–2:30 pm, laboratory—MTWThF 9–9:30 am.

49 **French for Graduate Students** (0)

For graduate students preparing for reading examinations. No academic credit. Tuition fee, $240. First Session: MTWThF 6–7:20 pm.

130 **Contemporary French Literature** (3)

Topic for summer: Post World War II Drama. First Session: MTW ThF 1:10–2:30 pm.

* Offered jointly by the Office of Program Development and the Department of Education. Hum 196 does not have a laboratory session; therefore students receive a maximum of 4 semester hours of credit for this course. Educ 196 has a laboratory session on curricular materials for elementary and secondary school teachers; therefore teachers receive 2 additional hours of credit for a total of 6 semester hours for this course.

256 **19th Century French Literature** (3)
Topic for summer: Zola. First Session: MWTh 4:10–6 pm.

299 **Thesis Research** (3)
First Session.

Geography and Regional Science

M.F. Gordon, *Chairman*

51 **Introduction to Geography** (3)
General survey of the various systematic, physical, and human fields of geography which play a role in the analysis and interpretation of man-environment relationships in both spatial and ecological contexts. First Session: Section A—MTWThF 11:10 am–12:30 pm. First 3-Week Education Workshop Session, June 12 to 30: Section B—June 13–16, lecture 3:45–5:45 pm, small group discussions—evening; June 19–30, lecture 10:10–12 am, conference 9:10–10 am, small group discussions and field work, afternoon.

127 **Population and Settlement** (3)
Patterns of world population; factors contributing to population pressures, growth, and migrations. Second Session: MTWThF 9:40–11 am.

141 **Urban Settlement** (3)
Distribution of urbanization on the surface of the earth; processes which lead to urbanization; theories which can be used to analyze the location of cities. First Session: MTWThF 11:10 am–12:30 pm.

143 **Human Geography of the Washington, D.C., Area** (3)
The Washington, D.C., area as a laboratory for examination of basic problems in human geography. Field observation included. MTWThF 9:40–11 am.

144 **Environmental Adaptation** (3)
Consideration of the man-environment relationship; emphasis on bioclimatological responses, disease ecology, nutritional demands, land capabilities, artificial environments, and environmental perception. Second Session: MTWThF 11:10 am–12:30 pm.

146 **Political Geography** (3)
Analysis of the interrelationships between the political community and the human and physical environment. First Session: MTWThF 1:10–2:30 pm.

189–90 **Readings in Geography** (arr.)
Both sessions.

295 **Research** (arr.)
Both sessions.

299–300 **Thesis Research** (3–3)
Both sessions.

Geology

Geza Teleki, *Chairman*

1–2 **Introductory Geology** (3–3)

Survey covering the principles of geology; emphasis on man's effect on the environment. Laboratory fee, $12 each session. First Session: Geol 1; Second Session: Geol 2. MTWTh 9:40 am-12:30 pm.

5 **Environmental Geology** (3)

The relation of man and society to natural environment; population evolution and resources; economic, legal, and political aspects. Second Session:TWTh 1:10–3:30 pm.

147 **Chemical Geology in the Earth and Ocean Sciences** (3)

Introduction to geochemical and chemical principles involved in geological systems and their application to contemporary problems in oceanology, pollution, and mineral exploration. Laboratory fee, $12. Second Session: MTWTh 9:40–12 am.

295 **Research** (arr.)

Research on problems approved by the Staff. Open to qualified students with advanced training. May be repeated for credit. Both sessions.

299–300 **Thesis Research** (3–3)

First Session: Geol 299; Second Session: Geol 300.

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Germanic Languages and Literatures

Carl Steiner, *Chairman*

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

1–2 **First-year German** (3–3)

A year course: credit toward a degree at this University given on completion of Germ 2. Essentials of German grammar; reading of easy prose. Aural-oral practice in language laboratory. Laboratory fee, $17.50 each session. First Session: Germ 1: Second Session: Germ 2. Classroom: MTWThF 6–7:20 pm. Laboratory: Section M—MTh 5–5:50 pm; Section N—MTh 7:30–8:20 pm.

3–4 Second-year German (3–3)

A year course: credit toward a degree at this University given on completion of Germ 4. Selections from modern German prose; continuation and review of grammar. Aural-oral practice in language laboratory. Prerequisite: Germ 1–2 or equivalent. Laboratory fee, $17.50 each session. First Session: Germ 3; Second Session: Germ 4. Classroom: MTWThF 7:35–8:55 pm. Laboratory: Section M—MTh 5–5:50 pm; Section N—MTh 6:30–7:20 pm.

47 Beginning German for Reading Examination Candidates (0)

Specifically for graduate students with little or no German who are preparing for reading examinations. No academic credit. Tuition fee, $240. First Session: MTWTh 5:45–7:25 pm.

49 German Readings for Nonmajor Students (3)

Primarily for graduate students preparing for reading examinations, undergraduates admitted. No academic credit for graduate students. Prerequisite: Germ 4 or 47, or equivalent. Second Session: MTWTh 5:45–7:25 pm.

Health Care Administration

Leon Gintzig, *Chairman*

210 Advanced Financial Management of Health Care Institutions (3)

Nature and interpretation of health care institution financial reports. Techniques of financial planning and control; operation of third-party reimbursement contracts; capital needs, planning, and acquisition; case studies, field research. Prerequisite: HCA 209. June 12 through August 25.

215 Practicum in Health Project Planning (3)

Supervised practical instruction in agencies doing comprehensive health planning; emphasis on basic investigation and problem-solving techniques, including various methods of collecting, analyzing, and reporting data. Prerequisite: HCA 212. June 12 through August 25.

270 Research in Health Care Administration (3)

Field research. Primarily for doctoral candidates; open to other graduate students with consent of instructor. May be repeated for credit. June 12 through August 25.

285 Readings in Health Care Administration (3)

Supervised readings in some special areas or subdivisions of health care administration. Primarily for doctoral candidates; open to other students by arrangement. June 12 through August 25.

288 Seminar: Field Problem Studies in Health Care Administration (3)

Selected administrative issues and problems arising in health care facility situations. Primarily for doctoral students; open to other students by arrangement. May be repeated for credit. June 12 through August 25.

293 Residency I (3)

First third of the twelve-month residency, beginning June 1 or July 1.

Work experience under a qualified preceptor, periodic written progress reports, and a written major report. Sections A, B, C, and D.

296 **Residency II** (3)

First third of the twelve-month residency, beginning June 1 or July 1. For selected students who take a second year of residency.

History

C.J. Herber, *Chairman*

Departmental prerequisite: Hist 39–40 or 91–92 is prerequisite to courses 108 through 158 and 187 through 196; Hist 71–72, to courses 167 through 185; either Hist 39–40, 71–72, or 91–92, to courses 162 through 166. Prerequisite to Hist 105–6 is either Hist 39–40, 91–92, or a background in a science. Students may waive one or more of the prerequisite courses by passing a departmental waiver examination, by attaining scores of 600 or above on the College Entrance Examination Board Achievement Tests, or by good performance on Advanced Placement Examinations.
Prerequisite to all third-group and fourth-group History courses: the appropriate second-group preparation and consent of instructor. Fourth-group History courses are limited to graduate students; but they are primarily for doctoral candidates.

39–40 **European Civilization in Its World Context** (3–3)

Hist 39: political, social, economic, and cultural history to early modern era. Hist 40: from early modern era to present. Students who receive credit for Hist 39–40 cannot receive credit for Hist 91–92. First Session: Hist 39—MTWThF 8:10–9:30 am. Second Session: Hist 40—MTWThF 9:40–11 am.

71–72 **Introduction to American History** (3–3)

Hist 71: political, social, economic, and cultural forces of the United States in their world setting from 1492 to 1861. Hist 72: from 1861 to present. First Session: Hist 71A—MTWThF 11:10 am–12:30 pm; Hist 72A—MTWThF 1:10–2:30 pm. Second Session: Hist 71B—MTW ThF 9:40–11 am; Hist 72B—MTWThF 1:10–2:30 pm.

113 **Early Middle Ages** (3)

Mediterranean region from 4th to 11th century; emphasis on Byzantium. First Session: MTWThF 9:40–11 am.

*127 **Theories of History** (3)

Critiques of philosophies of history: idea of progress, historicism, Hegelian-Marxian dialectic, cylical and social-scientific views. Contemporary problems of historical knowledge. First Session: MTWThF 11:10 am–12:30 pm.

131 **History of Germany** (3)

Political, social, and cultural development from Reformation to unification. Second Session: MTWThF 8:10–9:30 am.

*An interdepartmental course offered by the departments of History and Philosophy.

138 **History of World Communism** (3)

First Session: MTWThF 11:10 am-12:30 pm. (See Russian-East Asian Studies program, pages 36–37.)

139 **World History in the 20th Century** (3)

Diplomatic, political, and cultural factors from the turn of the century to the Munich settlement of 1938. First Session: MTWThF 11:10 am–12:30 pm.

151 **History of England and Great Britain** (3)

Development of English civilization and its impact on Western culture to 1689. First Session: MTWThF 9:40–11 am.

158 **Modern Jewish History** (3)

A secular history of the Jewish people from the 18th century to the present state of Israel, with particular emphasis on European political, economic, and cultural influences. First Session: MTWThF 9:40–11 am.

172 **U.S. Social History** (3)

The Urban-Industrial Era from 1861 to present. Second Session: MTWThF 1:10–2:30 pm.

176 **U.S. Political History** (3)

Civil War to New Deal. First Session: MTWThF 9:40–11 am.

182 **U.S. Diplomatic History**

Survey of American foreign relations in the 20th century. First Session: MTWThF 1:30–2:50 pm.

185 **Representative Americans** (3)

Significant and pivotal personalities in government, business, science, religion, journalism, the arts, and social reform. Second Session: MTWThF 9:40–11 am.

187 **History of Modern China** (3)

First Session: MTWThF 9:40–11 am. (See Russian-East Asian Studies program, pages 36–37.)

193 **History of the Near East** (3)

Byzantine, Arab, Persian, and Islamic backgrounds; rise and decline of the Ottoman Empire; action of European powers in the area; Ottoman breakup into the Turkish Republic and other states. Second Session: MTWThF 11:10 am–12:30 pm.

203–4 **Research Seminar** (3–3)

Prerequisite: Departmental approval. First Session: Hist 203; Second Session: Hist 204. As arranged.

237 **Seminar: Soviet Foreign Policy, 1917–1953** (3)

First Session: TTh 6–8:40 pm. (See Russian-East Asian Studies program, pages 36–37.)

248 **Reading Seminar: Modern European and Near Eastern History** (3)

Admission by permission of instructor. Second Session: TTh 2–4:30 pm.

278 **Research Seminar: American History** (3)
Admission by permission of instructor. First Session: As arranged.

299–300 **Thesis Research** (3–3)
Both Sessions.

387 **Readings in the History of Sino-Soviet Relations** (3)
First Session: MWF 6:10–8 pm. (See Russian-East Asian Studies program, pages 36–37.)

396 **Readings in Modern Far Eastern History** (3)
Second Session: MWF 6:10–8 pm. (See Russian-East Asian Studies program, pages 36–37.)

399 **Dissertation Research** (arr.)
Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

For information concerning the special program in Russian-East Asian Studies, see pages 36–37.

nstitute for Sino-Soviet Studies

or information concerning the Russian-East Asian Studies program, see pages 6–37.

ournalism

C. Willson, *Chairman*

72 **Introduction to Mass Communication** (3)
Mass media, problems of contemporary journalism, emphasis on media-government relations. First Session: MTWThF 9:40–11 am.

111 **Reporting** (3)
Gathering, evaluating, and writing news. Second Session: MTWThF 9:40–11 am.

150 **News Coverage in Washington** (3)
A survey of the way news is gathered and reported in the nation's capital by wire services, newspaper bureaus, and the local dailies. Field trips to major news centers; practice coverage. Second Session: MTWThF 11:10 am–12:30 pm.

Law

A list of courses to be offered during the summer of 1972 at the National Law Center will be available in a Law Center announcement scheduled to be issued during January 1972. Copies of this announcement may be obtained from the National Law Center.

Management Science

E.K. Winslow, *Chairman*

118 **Introduction to Data Processing** (3)

Basic principles and methods. A management-oriented introduction to the fundamentals, potentials, and problems of computer-based data processing as a tool for record-keeping, resource-controlling, and decision-making. First Session: MTWTh 4:10–5:50 pm.

119 **Data Processing Programming** (3)

Basic principles and methods. Problem-solving illustrated through analysis, flow charting, and programming of business-oriented data processing problems. Students write programs in FORTRAN and COBOL using the University's IBM 360 computer. Prerequisite: Mgt 118. Second Session: MTWThF 9:40–11 am.

*201 **Advanced Administrative Management** (3)

Principles and practices common to administrative units of all kinds. First Session: Section A—MWF 4:10–6 pm; Section B—MWF 6:10–8 pm. Second Session: Section C—MWF 6:10–8 pm.

203 **Mathematics for Management** (3)

Mathematical concepts employed in the solution of management problems. Applications of analytical geometry, functions, elements of calculus, and linear algebra to optimization problems. Prerequisite: algebra. First Session: MWF 4:10–6 pm.

204 **Quantitative Factors in Administration** (3)

Survey of quantitative techniques used in the solution of management problems. Potentials and limitations of mathematical models and proper areas for their application. Topics include probability, statistical decision theory, linear programming, waiting line, inventory replacement models. First Session: Section A—MWF 6:10–8 pm. Second Session: Section B—MWF 8:10–10 pm.

207 **Human Behavior in Organizations** (3)

Individual, group, intergroup, and other human behavior and development; application of social science research to administration. Practical applications emphasized. First Session: Section A—MTWTh 5:45–7:25 pm; Section B—MWF 6:10–8 pm. Second Session: Section C—MWF 4:10–6 pm; Section D—MWF 8:10–10 pm.

* A special section of this course, Mgt 201D, for students in the Navy Graduate Financial Management Program, will be offered July 31 to September 1; hours to be arranged.

218 **Survey of Data Processing** (3)

A management-oriented presentation of the vocabulary, concepts, and trends in computer hardware and software, information systems design and development, organizational impact, and effective management; milestones of past and current research; computer technology as a rapidly evolving force of major significance in business, government, and industry. Designed to provide comprehension of information technology necessary for contribution to an organizational data processing effort or as a preparation for more advanced study. First Session: MWF 6:10–8 pm.

221 **Management Information Systems Development and Application** (3)

Development of management information systems, integration of data processing in operations of government or business, impact on management organization and decision-making. Case studies. Prerequisite: Mgt 218 or 219, or permission of instructor. First Session: MWF 6:10–8 pm.

222 **Seminar: Advanced Digital Computer Concepts** (3)

Current problems in the design and implementation of computer-based systems, emphasis on current state-of-the-art through discussion with leading experts in the field and analysis of literature. Admission by permission of instructor. Second Session: MWF 6:10–8 pm.

225 **Introduction to Managerial Statistics** (3)

The mathematics of probability and statistics and its applications in management science and operations research. Topics include random variables; discrete and continuous probability distributions; moments and other descriptive measures; sampling theory; and an introduction to statistical estimation, hypothesis testing, and regression analysis. Prerequisite: Mgt 203 or equivalent. First Session: MWF 8:10–10 pm.

226 **Managerial Statistics** (3)

Management applications of the theory and techniques of mathematical statistics. Topics include maximum likelihood and other methods of estimation, hypothesis testing, descriptive measures of bivariate distributions, regression and correlation, analysis of time series, econometric models and multiple regression, statistical decision theory, and the revision of probabilities in decision-making. Prerequisite: Mgt 225. Second Session: MWF 6:10–8 pm.

228 **Systems Analysis by Simulation** (3)

Methods of systems analysis via computer simulation. Particular attention to inventory models, although queuing systems and management planning models are also covered. Prerequisite: Mgt 226. Second Session: MWF 8:10–10 pm.

262 **Seminar: Contemporary Administrative Theory** (3)

Primarily for doctoral students. Current and prospective theory and practice from an inter- and trans-disciplinary viewpoint. Topics include general systems theory, game theory, axiology and management values, antithetics, value engineering, cybernetic systems, decision theory, innovation and creativity models, and general semantics. Prerequisite: Mgt 201, 204, 207, 224. Second Session: MWF 6:10–8 pm.

Mathematics

T.P.G. Liverman, *Chairman*

3 **College Algebra** (3)

Equivalent to the standard two years of high school algebra with several additional topics. Prerequisite: one year each of high school algebra and high school geometry. First Session: MTWThF 6–7:20 pm.

6 **Plane Trigonometry** (3)

Prerequisite: two years of high school algebra and one year of high school geometry, or Math 3 (or concurrent registration therefor). Second Session: MTWThF 6–7:20 p.m

9 **General Mathematics I** (3)

For students electing Math 9 and 10 as a terminal sequence. Logic, sets, number systems. Prerequisite: two years of high school mathematics. First Session: Section A—MTWThF 8:10–9:30 am. Second Session: Section B—MTWThF 4:10–5:30 pm.

10 **General Mathematics II** (3)

Mathematical systems, geometry, and introduction to statistics and probability. Prerequisite: Math 9. Second Session: MTWThF 8:10–9:30 am.

30 **Precalculus** (3)

Set theory, inequalities, basic analytic geometry, functions and relations. Polynominal, trigonometric, logarithmic, and exponential functions. Prerequisite: Math 3 and 6; or one and one-half years of high school algebra, one year of high school geometry, and one-half year of high school trigonometry; or equivalent. Prior to registration, new students should take a placement examination in algebra and trigonometry. First Session: Section A—MTWThF 7:35–8:55 pm. Second Session: Section B—MTWThF 9:40–11 am.

31 **Calculus of One Variable** (3)

Differentiation and integration of algebraic and elementary transcendental functions, with simple applications. Prerequisite: Math 30 or equivalent.* First Session: Section A—MTWThF 9:40–11 am. Second Session: Section B—MTWThF 7:35–8:55 pm.

32 **Calculus of Several Variables** (3)

Partial derivatives, multiple integrals, infinite series. Prerequisite: Math 31. First Session: Section A—MTWThF 6–7:20 pm. Second Session: Section B—MTWThF 9:40–11 am.

33 **Calculus of Vector Functions** (3)

Elementary linear algebra, vectors, and matrices. Vector calculus, implicit function theory. Prerequisite: Math 32. Second Session: MTWThF 6–7:20 pm.

34 **Introduction to Linear Algebra** (3)

Linear functions, solutions of equations, dimension and rank, determinants, eigenvalues, change of basis. Prerequisite: Math 31 or permission of instructor. Second Session: MTWThF 7:35–8:55 pm.

* Math 30 may be waived as a prerequisite requirement by examination on scheduled dates.

111 **Mathematics for Engineers and Physicists I** (3)

Differential equations, linear and multilinear algebra, Laplace transform. Prerequisite: Math 33, 34; or permission of instructor. First Session: MTWThF 7:35–8:55 pm.

112 **Mathematics for Engineers and Physicists II** (3)

Fourier integral, Fourier series, partial differential equations. Prerequisite: Math 111. Second Session: MTWThF 7:35–8:55 pm.

113 **Graph Theory** (3)

Directed and undirected graphs; bridges, cutpoints, and blocks; connectivity; partitions; Eulerian and Hamiltonian graphs; planarity; coloring problems. Prerequisite: Math 32. Second Session: MTWThF 7:35–8:55 pm.

124 **Introduction to Matrix Theory** (3)

Operations on matrices, linear equations, matrix inversion, vector spaces, characteristic roots and vectors, spectral theorem, quadratic forms. Prerequisite: Math 32, 34. First Session: MTWThF 7:35–8:55 pm.

139 **Advanced Calculus I** (3)

Review and extension of elementary one-variable calculus, emphasis on the theoretical foundations; differential calculus of several variables. Prerequisite: Math 33. First Session: MTWThF 6–7:20 pm.

140 **Advanced Calculus II** (3)

Differential and integral calculus of several variables; implicit function theorem, differential forms. Prerequisite: Math 139 or equivalent. Second Session: MTWThF 6–7:20 pm.

191 **Special Topics** (3)

Summer 1972: topics in number theory. Admission by permission of instructor. May be repeated for credit. First Session: MTWThF 8:10–9:30 am.

270 **Tensor Analysis** (3)

Prerequisite: Math 123, 140; some acquaintance with elementary topology. First Session: MTWThF 7:35–8:55 pm.

295 **Reading and Research** (3)

May be repeated once for credit. Both sessions.

299–300 **Thesis Research** (3–3)

Both sessions.

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Mechanical Engineering

See "Engineering and Applied Science."

Music

George Steiner, *Chairman*

MUSIC HISTORY AND LITERATURE

3 Introduction to Musical Understanding (3)

Introductory history of musical styles, related to listening; elements and materials of music. First Session: Section A—MTWThF 11:10 am–12:30 pm. Second Session: Section B—MTWTh 5:45–7:25 pm.

106 Music of the Classic Period (3)

Study of styles, techniques, and literature from the 18th century schools through Haydn, Mozart, and Beethoven. Second Session: MTWThF 4:10–5:30 pm.

MUSIC THEORY

1 Elements of Music Theory (3)

Notation, scales, keys, intervals, terms, rhythms, ear-training, sight-singing, elementary keyboard harmony, melodic and harmonic dictation. First Session: MTWThF 4:10–5:30 pm.

5–6 Harmony (3–3)

Triads, inversions; chord analysis, construction, and progression; part-writing, modulations, altered chords. Prerequisite: Mus 1 or satisfactory passing of placement examination. First Session: Mus 5; Second Session: Mus 6 MTWThF 1:10–2:30 pm.

299–300 Thesis Research (3–3)

Both sessions.

APPLIED MUSIC

Applied Music courses listed below are offered in both sessions and may be repeated for credit. Each course has individual lessons of 45 minutes twice a week; supplementary fee, $40.

11 Piano (1)

13 Voice (1)

15 Organ (1)

17 **Violin** (1)

19 **Classical Guitar** (1)

21 **Viola** (1)

23 **Cello** (1)

25 **Bass** (1)

27 **Flute** (1)

29 **Recorder** (1)

31 **Oboe** (1)

33 **Clarinet** (1)

35 **Saxophone** (1)

37 **Bassoon** (1)

39 **French Horn** (1)

41 **Trumpet** (1)

43 **Trombone** (1)

45 **Percussion** (1)

47 **Harp** (1)

111 **Piano** (1)

113 **Voice** (1)

115 **Organ** (1)

117 **Orchestral Instrument** (1)

119 **Classical Guitar** (1)

Operations Research

ee "Engineering and Applied Science."

hilosophy

elma Z. Lavine, *Chairman*

61–62 **Introduction to Philosophy** (3–3)

Problems of modern philosophy. Phil 61: theories of reality. Phil 62: theories of knowledge. Phil 61 or 62 may be taken independently. First Session: Phil 61—MTWThF 8:10–9:30 am; Second Session: Phil 62—MTWThF 11:10 am–12:30 pm.

111 **History of Ancient Philosophy** (3)

History of Western philosophy from early Greece to the early Middle Ages. First Session: MTWThF 1:10–2:30 pm.

*127 **Theories of History** (3)

Critiques of philosophies of history: idea of progress, historicism, Hegelian-Marxian dialectic, cyclical and social-scientific views. Contemporary problems of historical knowledge. First Session: MTWThF 11:10 am–12:30 pm.

151 **Myth, Science, and the Modern Mind** (3)

Comparison of the mythical and scientific outlook; emphasis on the development and nature of scientific concepts, methodology, and explanation from Copernicus to Einstein. Second Session: MTWThF 9:40–11 am.

172 **American Philosophy** (3)

Philosophies of Peirce, Royce, James, Dewey, and Santayana as representatives of American thought. First Session: MTWThF 9:40–11 am.

201–2 **Readings and Research** (3–3)

Advanced readings and reports. Investigation of special problems. First Session: Phil 201; Second Session: Phil 202.

216 **Seminar: Kant** (3)

Critique of Pure Reason. Second Session: As arranged.

Physical Education

J.L. Breen, *Chairman*

The University is not responsible for injuries received in intramural games, or in any of the activities of the Department of Physical Education; and the student assumes full responsibility therefor.

55 **The Tao of Movement** (1)

A 3-week course, June 5 to 23: MTWThF 9:30–11 am. (See Dance Workshop, pages 33–34.)

57 **Dance Technique I** (1)

A 3-week course, June 5 to 23: MTWThF 11:30 am–1 pm. (See Dance Workshop, pages 33–34.)

†119 **Creative Dance for Children** (3)

The study of dance as an expressive medium for children; emphasis on concepts and principles, methods and materials. Consideration given to dance for children with special education problems. A 3-week course, July 3 to 21: MTWThF 10 am–1 pm.

* An interdepartmental course offered by the departments of Philosophy and History.
† A course requiring the full daytime attention of enrollees. Concurrent registration for another course scheduled in morning or afternoon not permitted.

120 **Repertory** (1 or 2)

A 3-week course, June 5 to 23: MTWThF 2–3:30 pm. (See Dance Workshop, pages 33–34.)

122 **Methods and Materials for Health Education** (3)

Curriculum planning and organization, methodology, selection and use of materials of health education, evaluation, basic health knowledge. A 6-week course, June 12 to July 21: TTh 4–6 pm.

123 **Advanced Dance Techniques** (1 or 2)

A 3-week course, June 5 to 23: MTWThF 11:30 am–1 pm. (See Dance Workshop, pages 33–34.)

180 **Application of Movement Education to Sports** (1)

A 1-week course, June 5 to 9: MTWThF 6–8 pm. (See Movement Workshop, page 35.)

181 **Analysis of Basic Movements for Children** (1)

A 1-week course, June 5 to 9: MTWThF 3:30–5:30 pm. (See Movement Workshop, page 35.)

182 **Movement Education for Young Children** (1)

A 1-week course, June 5 to 9: MTWThF 8–10 pm. (See Movement Workshop, page 35.)

202 **Conceptual Basis of Motor Learning** (3)
(Formerly Motor Learning)

Theories of learning and application to development of motor skills; motor theories of perceptual and conceptual learning. A 6-week course, June 12 to July 21: MW 6–8 pm.

232 **Current Issues in Elementary School Physical Education** (3)

Current philosophy, trends, and research; implications for curriculum, instruction, evaluation. A 6-week course, June 12 to July 21: TTh 6–8 pm.

239 **Recreation for Special Groups** (3)

Organization and administration of a community-oriented program for the mentally retarded; orthopaedic, neurological, cardiovascular, and other handicapping conditions; the culturally deprived. All age groups included. A 6-week course, June 12 to July 21: MW 8–10 pm.

297 **Advanced Topical Studies** (3)

Independent study or field project pertinent to the needs of the student, including synthesis and critique of background literature. Prerequisite: Educ 295 or permission of instructor. May be repeated once for credit. A 6-week course, June 12 to July 21: As arranged.

For information concerning Dance Workshop and Movement Workshop, see pages 33–34, 35.

Physics

Julian Eisenstein, *Chairman*

1 **General Physics** (4)

Topics in classical physics which form a foundation for modern physics. Prerequisite: two years of college preparatory mathematics or concurrent registration for Math 6. Laboratory fee, $11. First Session: lecture MTTh 1:10–3 pm. Section L: recitation WF 8:10–9:30 am and laboratory MWF 9:40–12 am; Section S: recitation WF 1:10–2:30 pm and laboratory MWF 3:10–5:30 pm.

2 **Introduction to Modern Physics** (4)

Selected topics in modern physics, including relativity and quantum theory. Prerequisite: Phys 1 or equivalent. Phys 1 may be waived on the basis of the College Entrance Examination Board Achievement Test or Advanced Placement Examination or by a departmental examination prior to registration. Laboratory fee, $11. Second Session: lecture MTTh 1:10–3 pm. Section J: recitation WF 8:10–9:30 am and laboratory MWF 9:40–12 am; Section P: recitation WF 1:10–2:30 pm and laboratory MWF 3:10–5:30 pm.

299 **Thesis Research** (3)

First Session.

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. First Session.

Political Science

H.L. LeBlanc, *Chairman*

Departmental prerequisite: P Sc 4 and 6 or 5 and 6 are prerequisite to all second-group courses in Political Science.

5 **Introduction to Political Science** (3)

Introduction to the study of comparative political systems; emphasis on structures and processes of major foreign governments and the force of basic ideologies. Students who receive credit for P Sc 5 cannot receive credit for P Sc 4. First Session: P Sc 5A—MTWThF 11:10 am–12:30 pm. Second Session: P Sc 5B—MTWThF 11:10 am–12:30 pm.

6 **Introduction to Political Science** (3)

Introduction to the study of the structure, powers, and processes of the American political system. First Session: P Sc 6A—MTWThF 9:40–11 am. Second Session: P Sc 6B—MTWThF 1:10–2:30 pm.

101 **Far East in the Modern World** (3)

First Session: MTWThF 8:10–9:30 am. (See Russian-East Asian Studies program, pages 36–37.)

103 **State Politics** (3)

(This course, together with P Sc 104, replaces former P Sc 103–4 State and Local Governments)

Theory and practice of American federalism, factors influencing state policy choices, state responsiveness to urban problems. Second Session: MTWThF 9:40–11 am.

104 **Urban Politics** (3)

(This course, together with P Sc 103, replaces former P Sc 103–4 State and Local Governments)

Demographic trends and implications, local metropolitan political systems, issues in urban politics, strategies of political change. Second Session: MTWThF 1:10–2:30 pm.

105 **Scope and Methods of Political Science** (3)

Nature of political inquiry, approaches to the study of politics and government, empirical methods of research. Prerequisite: Stat 51 or 53; or equivalent. Second Session: MTWTh 5:45–7:25 pm.

111 **Comparative Government and Politics** (3)

Government and politics of the principal constitutional democracies of Western Europe. First Session: MTWTh 5:45–7:25 pm.

*112 **Comparative Government and Politics** (3)

Government and politics of the communist nations; emphasis on the Soviet Union and the countries of Eastern Europe. First Session: MTWThF 9:40–11 am.

*115 **Government and Politics in Eastern Europe** (3)

Second Session: MTWThF 2:40–4 pm. (See Russian-East Asian Studies program, pages 36–37.)

118 **Political Theory: Nature and Growth of Western Political Thought** (3)

Renaissance to recent times. Philosophical roots of modern political order and disorder. Second Session: MTWThF 11:10 am–12:30 pm.

121 **U.S. Constitutional Law and Politics** (3)

Separation of powers, federal-state relationships, economic regulation. Prerequisite: junior status. First Session: MTWThF 11:10 am–12:30 pm.

125 **Legislative Process** (3)

(Formerly The American Congress)

Study of Congress and the state legislatures, including legislative power structure, selection of legislators and the roles they play, decision-making, and the relationship between the legislative and executive branches. First Session: MTWThF 4:10–5:30 pm.

126 **The American Presidency** (3)

Development of the institution, selection process, role of the presidency in policy-making. Second Session: MWTh 4:10–6 pm.

* 112, 115, and 161 are related in their subject matter, and credit for only one of the three be applied toward a degree.

146 **Public Opinion and Political Socialization** (3)
(Formerly Political Pressures and Public Reactions)
Sources of mass political attitudes and behavior, effects of mass attitudes and behavior on public policy. First Session: MTWThF 1:10–2:30 pm.

160 **Modern Communist Ideologies** (3)
First Session: MTWThF 4:10–5:30 pm. (See Russian-East Asian Studies program, pages 36–37.)

163 **Soviet Foreign Policy** (3)
First Session: MTWThF 5:45–7:25 pm. (See Russian-East Asian Studies program, pages 36–37.)

171 **International Politics** (3)
International actors, international and domestic environments of foreign policy, global and regional patterns, general characteristics of foreign policy. First Session: MTWThF 9:40–11 am.

172 **International Organizations** (3)
Development and operations of the United Nations, regional organizations, and functional international organizations. Second Session: MTWThF 9:40–11 am.

177 **Governments and Politics in Latin America** (3)
Political processes and institutions in Latin America; emphasis on Argentina, Brazil, Chile, and Mexico. First Session: MTWThF 1:10–2:30 pm.

178 **Latin America: Political Patterns and International Relations** (3)
U.S.-Latin American relations, inter-American diplomacy and organization, foreign policies of selected states, the Cuban revolution. First Session: MTWThF 4:10–5:30 pm.

182 **Public International Law and Organization** (3)
Survey of the public law of nations: continuation of the law of peace; attention to neutrality and the so-called law of war. Second Session: MTWThF 1:10–2:30 pm.

189 **African International Politics** (3)
Analysis of interstate relations in Africa and of selected aspects of African relations with the outside world. Recommended but not required: P Sc 190 or equivalent. First Session: MTWThF 11:10 am–12:30 pm.

*194 **Governments of China and Japan** (3)
First Session: MTWThF 11:10 am–12:30 pm. (See Russian-East Asian Studies program, pages 36–37.)

267 **Seminar: U.S. Foreign Policy** (3)
Enrollment limited to teachers. Second 3-week Education Workshop: Section A—lecture and discussion MTWThF 9:30–11:30 am; Section B—lecture and discussion MTWThF 1:30–3:30 pm. Conferences and field work as arranged. (See Workshop in United States Foreign Policy, page 40.)

* P Sc 162 and 194 are related in their subject matter, and credit for only one may be applied toward a degree.

297 **Independent Studies** (arr.)

Limited to Master's candidates. Permission of instructor, in writing, required. Both Sessions.

299–300 **Thesis Research** (3–3)

Both sessions.

For information concerning the special program in Russian-East Asian Studies, see pages 36–37.

Psychology

J.N. Mosél, *Chairman*

Departmental prerequisite: Psyc 1 or 5 or 6 is prerequisite to all other courses n Psychology. Six semester hours in Psychology courses are prerequisite to all econd-group courses in Psychology. The departmental prerequisite may be vaived with the permission of the instructor.

Third-group courses are limited to graduate students in Psychology, except by pecial permission of instructor and Chairman of the Department.

1 **General Psychology** (3)

Fundamental principles underlying human behavior. First Session: Section A—MTWThF 1:10–2:30 pm; Section B—MTWThF 4:10–5:30 pm. Second Session: Section C—MTWThF 8:10–9:30 am; Section D—MTWThF 4:10–5:30 pm.

6 **Principles and Methods of Psychology** (3)

An experimental approach to understanding behavior; individual and class experiments performed. Topics of motivation, learning, memory, and problem-solving. Laboratory fee, $6. First Session: lecture MWF 1:10–3 pm, laboratory TTh 1:10–3 pm.

8 **Psychology of Motivation and Personality** (3)

Introduction to the psychology of personality. Principles of motivation, personality development, social and cultural factors, and assessment and description of personality emphasized. Second Session: MTWTh 5:45–7:25 pm.

22 **Introduction to Educational Psychology** (3)

The contributions of psychology to education; emphasis on learning. First 3-Week Education Workshop Session, June 12 to 30: Section A—June 13–16, lecture 3:45–5:45 pm, small group discussions—evening; June 19–30, lecture 10:10–12 am, conference 9:10–10 am. Second Session: Section B—MTWThF 1:10–2:30 pm.

29 **Psychology of Childhood** (3)

Developmental approach to study of the child. Emphasis on the socialization process, learning, and the child's view of the world. First Session: MTWThF 1:10–2:30 pm.

101 **Abnormal Psychology** (3)

Causes, diagnosis, treatment, and prevention of various types of maladjustments and mental disorders. Prerequisite: 6 semester hours in psychology, or 3 in psychology and 6 in a biological science. First Session: Section A—MTWThF 1:10–2:30 pm. Second Session: Section B—MTWThF 8:10–9:30 am.

110 **Cognitive and Perceptual Development** (3)

Concepts and research in the area of developmental psychology; emphasis on the growth and development of perception, cognition, and language. First Session: MTWThF 4:10–5:30 pm.

115 **Psychology of Language and Communication** (3)

Introduction to psycholinguistics and verbal behavior. Information theory, generative grammar theory, cultural and linguistic structures in the perception and learning of language. First Session: MTWThF 4:10–5:30 pm.

121 **Psychology of Learning** (3)

Theories and issues related to basic learning processes as determinants of behavior. Emphasis on current research using both human and animal subjects. Second Session: MTWThF 1:10–2:30 pm.

129 **Theories of Personality** (3)

Survey of personality theories; emphasis on their application to problems of individuals. First Session: MTWThF 11:10 am–12:30 pm.

131 **Psychological Tests** (3)

Survey of psychological tests and their more common uses in business, industry, government, law, medicine, and education. Material fee, $7. Second Session: MTWThF 11:10 am–12:30 pm.

145 **Psychology of Management** (3)

Primarily for students in the schools of Engineering and Applied Science and Government and Business Administration. Introduction to principles of industrial organizations and personnel selection. First Session: MWTh 6:10–8 pm.

151 **Social Psychology** (3)

Social foundations of attitudes and behavior: cognition, motivation, role-behavior, communication, small-group processes, racial attitudes, nationalism, and war. Second Session: MTWThF 9:40–11 am.

156 **Psychology of Attitudes and Public Opinion** (3)

Psychology of opinion formation, measurement of opinion, social determinants of attitudes, psychological processes in propaganda, bases of receptivity to propaganda, psychological warfare. First Session: MTWTh 7:35–9:15 pm.

191 **Independent Research in Psychology** (3)

Opportunity for work on individual library or experimental projects. Open to qualified students by permission; arrangements must be made with the sponsoring faculty member prior to registration. May be repeated once for credit. Both sessions.

196 **History and Systems of Psychology** (3)

Senior capstone course which includes a survey and integration of the major viewpoints and concepts of psychology. Required of Psychology majors. Second Session: MTWThF 9:40–11 am.

211 **Assessment of Cognitive Functioning** (3)

Concepts of intelligence and achievement and their assessment through a variety of group and individual procedures. Emphasis on evaluation of children. Material fee, $7. Admission by permission of instructor. Second Session: MWTh 4:10–6 pm.

212 **Personality Assessment by Projective Techniques** (3)

Methods of personality assessment, including psychometric and projective tests. Material fee, $7. Admission by permission of instructor. Second Session: MWTh 6:10–8 pm.

215 **Personality Assessment by Multiple Procedures** (3)

Consideration and use of a wide range of procedures in assessment of personality and psychopathology of children. Prerequisite: Psyc 207–8 or 211 and 212. Graduate students in fields other than Psychology admitted by permission of instructor. Material fee, $7. First Session: MWTh 6:10–8 pm.

218 **Seminar: Systems of Psychotherapy** (3)

Introduction to theory and technique of psychotherapeutic approaches: psychoanalytic, ego-centered, nondirective, transactional, and others. Original sources surveyed. First Session. MWTh 4:10–6 pm.

283–84 **Practicum in Clinical Psychology** (3–3)

Supervised practical instruction in agencies doing clinical psychological work. Prerequisite: Psyc 212. Admission by permission of instructor. Both sessions.

289 **Seminar: Current Topics in Experimental Psychology** (3)

Review and discussion of contemporary research and theory in a specialized field of psychological study, by leaders in the field. Independent topics each semester; may be repeated for credit. First Session: MWTh as arranged.

295 **Independent Research in Psychology** (3)

Individual library or experimental research under supervision of staff member. Arrangements must be made with sponsoring faculty member prior to registration. May be repeated once for credit. Both sessions.

299–300 **Thesis Research** (3–3)

Both sessions.

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Public Administration

D.R. Cloutier, *Chairman*

221 **Management in the Executive Branch** (3)

Analysis of application of management theory and practice in the executive branch of the federal government; emphasis on staff responsibilities and relationships and internal organization and control. Second Session: TTh 6:10–9 pm.

223 **Behavioral Factors in Large Organizations** (3)

Analysis of the nature and characteristics of bureaucracy; dysfunctionalism; approaches to policy guidance and leadership, particularly in large public organizations; influence and control systems. Second Session: MWTh 6:10–8 pm.

248 **Financing Metropolitan Services** (3)

Analysis of the structure and administration of public finance of local governments. First Session: MWF 6:10–8 pm.

249 **Administration in Metropolitan Area Governments I** (3)

Public administration in metropolitan areas. An ecological approach to understanding the interrelationship between the management of urban programs and economic, social, and political factors that affect the urban environment. First Session: TTh 6:10–9 pm.

251 **Governmental Budgeting** (3)

Survey of the basic concepts, principles, and practices in governmental budgeting; interrelationship of planning, programming, and budgeting; their role in the management process. Second Session: MWTh 6:10–8 pm.

260 **Seminar: Policy Formulation and Administration** (3)

Analysis in depth of factors and processes involved in policy development with particular attention to selected areas of national policy; development of agency goals and objectives. First Session: TTh 6:10–9 pm.

271 **Readings and Research in Public Administration** (3)

Advanced directed readings and research in specific areas. First Session.

299 **Thesis Seminar** (3)

Examination of thesis standards, research philosophy and methodology. First Session: As arranged.

300 **Thesis Research** (3)

Second Session.

Religion

R.G. Jones, *Chairman*

9 **The Old Testament** (3)

Historical and literary study of the Old Testament with consideration of

development of religious ideas, institutions, and outstanding personalities. First Session: MTWThF 9:40–11 am.

59–60 **History of Religions** (3–3)

Origins, evolution, and contemporary status in historical context. Rel 59: primitive religion and the religions of the East (Hinduism, Buddhism, Taoism, Confucianism, Shinto). Rel 60: religions of the West and Near East (ancient religions, Judaism, Christianity, Islam). First Session: Rel 60—MTWThF 11:10 am–12:30 pm; Second Session: Rel 59—MTWTh 5:45–7:25 pm.

124 **Contemporary Movements in Theology** (3)

Theological approach and systems of a selected number of modern theologians. First Session: MTWThF 1:10–2:30 pm.

137 **The Land of Israel and the Growth of the Western Religions** (6)

(See Summer Institute in Israel, page 38.)

162 **Symbolism in the History of Religions** (3)

Religious symbolism, myth, legend, and ritual in the religions of the world; various theoretical analyses. Second Session: MTWThF 1:10–2:30 pm.

172 **Religion in American Culture** (3)

Growth of religious bodies and institutions in relation to American culture, development of religious thought, and analysis of the contemporary religious scene. First Session: MTWTh 5:45–7:25 pm.

291–92 **Readings and Research** (3–3)

Investigation of special problems. Both sessions.

299–300 **Thesis Research** (3–3)

Both sessions.

For information concerning the Summer Institute in Israel, see page 38.

Slavic Languages and Literatures

C.A. Moser, *Chairman*

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

5–6 **Intensive Beginning Russian** (6–6)

Beginners' intensive course in the fundamentals of Russian. Prerequisite to Slav 6: Slav 2 or 5. Laboratory fee, $17.50. First Session: Slav 5; Second Session: Slav 6. Classroom—MTWThF 9:30–11:30 am and 12:30–2:30 pm, laboratory—TTh 3:10–4 pm.

47 **Beginning Russian for Reading** (3)

For students with little or no knowledge of Russian who wish to learn to read the language only. Credit assigned only after completion of Slav 48 or 49. No academic credit for graduate students. First Session: MTWTh 5:45–7:25 pm.

49 **Russian Readings for Nonmajor Students** (3)

Primarily for graduate students preparing for reading examinations in the natural and social sciences. No academic credit for graduate students. Prerequisite: Slav 47 or equivalent. Second Session: MTWTh 5:45–7:25 pm.

91–92 **Introduction to Russian Literature** (3–3)

Survey of Russian literature, in translation, from earliest periods through literary masterpieces of the 19th and 20th centuries. Term paper required. First Session: Slav 91; Second Session: Slav 92. MTWTh 5:45–7:25 pm.

Sociology

R.G. Brown, *Chairman*

Departmental prerequisite: Soc 1 is prerequisite to all second- and third-group courses in Sociology.

1–2 **Introductory Sociology** (3–3)

Soc 1: general principles of sociology; development of culture and personality, impact of groups and institutions on man's social behavior. Survey of fields within sociology. Soc. 2: analysis of major social problems confronting the United States; factors producing social problems, their nature and treatment. First Session: Soc 1; Second Session: Soc 2. MTWThF 11:10 am–12:30 pm.

61 **Development of Social Thought** (3)

Examination of concepts and theories relevant to the nature of society and human relationships from ancient writings to the 20th century. Prerequisite: Soc 1. Second Session: MTWThF 11:10 am–12:30 pm.

110 **The Sociology of Work** (3)

Introductory survey of industrial sociology; sociology of occupations and professions; industry-community relations; and analysis of large, complex organizations. First Session: MTWThF 8:10–9:30 am.

124 **Medical Sociology** (3)

Social factors and processes related to the etiology and treatment of physical and mental illness; medical occupations and professions, medical organizations, problems of delivery of health care services. First Session: MTWThF 9:40–11 am.

126 **Urban Sociology** (3)

Place of the city in larger society; growth of the city, problems of urban living, group life, personality, urban housing, city planning, and suburban development. Second Session: MTWThF 8:10–9:30 am.

127 **Population Problems** (3)

Composition of populations, trends in population growth and population pressure, factors producing population movements, effects of migration, population policies—eugenics and birth control. First Session: MT WThF 1:10–2:30 pm.

129 **Race and Minority Groups** (3)

Analysis of relationships between dominant and minority groups in society, particularly in the United States; nature and range of problems; analysis of the phenomenon of prejudice. First Session: MTWThF 11:10 am–12:30 pm.

130 **Social Stratification** (3)

Analysis of distribution of resources and opportunities for participation, education, and social mobility in American society; international comparisons; analysis of public policies which affect these distributions. Second Session: MTWThF 9:40–11 am.

132 **Political Sociology** (3)

Analysis of problems involved in the study of power relations in society; distribution of power in society; types and processes of government; political participation and political mobilization. Second Session: MTWThF 1:10–2:30 pm.

133 **Sociology of Education** (3)

Analysis of educational systems from institutional perspectives and as agencies of socialization; relationships of education in general to society, including technological, communal, and subcultural components. First Session: MTWThF 1:10–2:30 pm.

135 **Juvenile Delinquency** (3)

Factors producing delinquency, juvenile detention, the juvenile court, training schools, treatment of offenders. First Session: MTWThF 9:40–11 am.

136 **Criminology** (3)

Nature and distribution of crime as related to the development and operation of criminal law and various social and legal institutions in urban society. Second Session: MTWThF 9:40–11 am.

143 **Social Movements** (3)

General survey of the various forms of collective behavior (fads, panics, riots, social movements, etc.), and a more detailed study of the genesis, development, and decay of social movements and social revolutions. First Session: MTWThF 4:10–5:30 pm.

144 **Public Opinion and Mass Communication** (3)

Communication process with emphasis on international communications, propaganda, and mass media; measurement of propaganda campaigns. First Session: MTWThF 9:40–11 am.

295 **Research** (3)

May be repeated once for credit. Both sessions.

299–300 **Thesis Research** (3–3)

Both sessions.

398 **Advanced Reading and Research** (arr.)

Limited to students preparing for the Doctor of Philosophy general examination. May be repeated for credit. Both sessions.

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Spanish

Administered by the Department of Romance Languages and Literatures, J.F. Burks, *Chairman*

Placement Examination: A student who has not been granted advanced standing and who wishes to continue in college the language begun in high school must take a placement examination before registration. Upon completion of the examination, assignment is made to the appropriate course, with credit assigned on the usual basis.

Departmental prerequisite: Span 3–4 or 6, or equivalent, is required as prerequisite to all second-group courses in Spanish.

1–2 **First-year Spanish** (3–3)

A year course: credit toward a degree at this University given on completion of Span 2. For beginners. Pronunciation, conversation, grammar, composition, reading of modern Spanish prose. Aural training, oral practice in language laboratory. Laboratory fee, $17.50 a session. First Session: Span 1; Second Session: Span 2. Classroom—MTWThF 8:10–9:30 am, laboratory—MTh 10:10–11 am.

3–4 **Second-year Spanish** (3–3)

A year course: credit toward a degree at this University given on completion of Span 4. Conversation, grammar, composition, reading of modern Spanish prose, introduction to Hispanic civilization. Aural training, oral practice in language laboratory. Prerequisite: Span 1–2, 2*x*, or two years of high school Spanish. Laboratory fee, $17.50 a session. First Session: Span 3; Second Session: Span 4. Classroom—MTWThF 11:10 am–12:30 pm, laboratory—MTh 9:10–10 am.

9–10 **Spanish Conversation and Composition** (3–3)

Prerequisite: Span 4 or equivalent and permission of instructor. First Session: Span 9; Second Session: Span 10. MTWThF 11:10 am–12:30 pm.

129 **The Romantic Drama in Spain** (3)

Lectures on the Spanish Romantic Drama, class analysis of representative plays, collateral readings. First Session: MTWThF 1:10–2:30 pm.

141 **Introduction to Spanish American Literature** (6)

Highlights of Spanish American literature through the colonial and modern periods. Of special interest to majors in Latin American Studies. First Session: MTWThF 9:40–11 am and 1:10–2:30 pm.

299 **Thesis Research** (3)
First Session.

Special Education

Perry Botwin, *Chairman*

SIX-WEEK COURSES—JUNE 12 TO JULY 21

241 **Internship: Children with Behavioral Problems** (6)
Practicum experience early in the training sequence, consisting of observation of, and interaction with, children with behavioral problems. Under the direction of qualified teachers in a field setting. As arranged.

291 **Practicum in Teaching Children with Behavioral Problems** (6)
Supervised student teaching in programs for children with behavioral problems. Under the direction of a qualified teacher and the supervision of the University staff. Minimum of 210 clock hours required. As arranged.

292 **Practicum in Teaching Young Children in Special Education** (6)
Supervised student teaching in special education in classrooms for young children. Minimum of 210 clock hours required. As arranged.

294 **Practicum in Diagnostic-Prescriptive Teaching** (6)
Supervised field experience in diagnostic-prescriptive teacher programs. Admission by permission of instructor. Students who register for S Ed 294 must also register for S Ed 351 in the Third 3-Week Education Workshop Session. As arranged.

FIRST 3-WEEK EDUCATION WORKSHOP SESSION—JUNE 12 TO 30

Classes meet Monday through Friday. Each workshop course requires the full day; concurrent registration for another daytime course is not permitted. June 13 to 16—small group discussions, evening; June 19 to 30—small group discussions and field work, afternoon.

170 **Interpersonal/ Intrapersonal Relationships for Teachers** (3)
Consideration of factors leading to successful interaction with children. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 10:10–12 am; conference 9:10–10 am.

240 **Programming for Children with Behavioral Problems** (3)
Analysis of educational provisions for children with behavioral problems through study of ecological considerations in the light of contemporary special education theory. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 8:10–10 am; conference 10:10–11 am.

242 **Clinical Teaching of Children with Behavioral Problems** (3)
Lectures and discussions exploring various psychoeducational techniques of teaching children and adolescents with behavioral problems. June

13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 10:10–12 am; conference 9:10–10 am.

250 **Specialized Techniques and Materials for Diagnostic-Prescriptive Teachers** (3)

Selected materials and techniques used in diagnostic-prescriptive teaching. Admission by permission of instructor. Students who register for S Ed 250 must also register for S Ed 252 in the Second 3-Week Education Workshop Session. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: workshop and laboratory 8:10 am–4 pm.

251 **Psychosocial Factors in Diagnostic-Prescriptive Teaching** (3)

Psychosocial factors significant in the process of diagnostic-prescriptive teaching. Admission by permission of instructor. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 8:10–10 am; conference 10:10–11 am.

253 **The Humanizing Curriculum in Diagnostic-Prescriptive Teaching** (3)

Curriculum concepts and modifications aimed at enhancing the classroom environment for learning and growth. Admission by permission of instructor. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 8:10–10 am; conference 10:10–11 am.

260 **Diagnosis of the Educational Needs of Younger Children** (3)

Lecture-demonstration course designed to explore the existing and experimental diagnostic tools to aid in education planning for young children. Admission by permission of instructor. June 13 to 16: lecture 3:45–5:45 pm. June 19 to 30: lecture 10:10–12 am; conference 9:10–10 am.

491 **Dissertation Research** (arr.)

SECOND 3-WEEK EDUCATION WORKSHOP SESSION—JULY 3 TO JULY 21

Classes meet Monday through Friday. Concurrent registration for another daytime course is not permitted, because each workshop course requires the full day—lecture and conference in the morning; small group discussion and field work or laboratory in the afternoon.

201 **Introduction to Special Education** (3)

Survey course to acquaint prospective teachers with special education and to help them become aware of the various educational modifications necessary to accommodate children in a school program. Lecture 8:10–10 am; conference 10:10–11 am.

252 **Professional Internship for Diagnostic-Prescriptive Teachers** (3)

Supervised school experience in diagnostic-prescriptive teaching. Admission by permission of instructor. Students who register for S Ed 252 must also register for S Ed 250 in the First 3-Week Education Workshop Session. Workshop and laboratory 8:10 am–4 pm.

265 **Utilization of Supportive Personnel in Early Educational Programs for Exceptional Children** (3)

Methods and opportunities for the use of para-professionals, volunteers, and parents in the education of young children with special needs. Lecture 8:10–10 am; conference 10:10–11 am.

269 **Clinical Teaching in Early Childhood Education** (3)

Supervised clinical internship in special education with young children. Admission by permission of instructor. Lecture 10:10–12 am; conference 9:10–10 am.

342 **Seminar: Crisis/Resource Teaching** (3)

Topics and concepts relevant to an exploration of alternative models in the education of children perceived as having learning/behavior problems. Admission by permission of instructor. Lecture 8:10–10 am; conference 10:10–11 am.

343 **Psychoeducational Diagnosis of Children** (3)

Lecture and laboratory course designed to develop *educational* strategies for children who present behavior or learning problems in the schools. Admission by permission of instructor. Lecture 10:10–12 am; conference 9:10–10 am.

350 **The Diagnostic-Prescriptive Teacher** (3)

Rationale, operational models, techniques, and problems relevant to implementation of diagnostic-prescriptive teacher programs. Admission by permission of instructor. Lecture 8:10–10 am; conference 10:10–11 am.

370 **Intrapersonal Dynamics in Special Education** (3)

Small group exploration of intrapersonal factors essential to understanding roles and interpersonal techniques in teaching exceptional children. Admission by permission of instructor. Lecture 8:10–10 am; conference 10:10–11 am.

491 **Dissertation Research** (arr.)

THIRD 3-WEEK EDUCATION WORKSHOP SESSION—JULY 24 TO AUGUST 11

Classes meet Monday through Friday. Concurrent registration for another daytime course is not permitted, because each workshop course requires the full day—lecture and conference in the morning; small group discussion and field work or laboratory in the afternoon.

204 **Problems in Urban Education** (3)

Problems and issues in urban education; emphasis on factors affecting successful educational practice in low-income areas. Admission by permission of instructor. Lecture 8:10–10 am; conference 10:10–11 am.

261 **Special Methods for Teaching Young Children** (3)

Study and laboratory practice in specialized techniques and materials for young children. Students develop and experiment with new methods and materials. Admission by permission of instructor. Lecture 10:10–12 am; conference 9:10–10 am.

289 **The Diagnostic Procedure** (3)

Examination of the rationale, techniques, and tools essential to academic and psychosocial assessment. Designed to provide practice as well as familiarity with the diagnostic procedure. Admission by permission of instructor. Lecture 10:10–12 am; conference 9:10–10 am.

351 Seminar for Diagnostic-Prescriptive Teachers (3)

Current practices in regular and special education as they affect the diagnostic-prescriptive teacher; emphasis on concurrent field experience. Admission by permission of instructor. Students who register for S Ed 351 must also register for S Ed 294, a 6-week course offered June 12 to July 21. As arranged.

Speech and Drama

G.F. Henigan, *Chairman*

1 Communicative Speaking and Listening (3)

Basic theories and principles of speech communication; composition, delivery, and criticism of speaking in interpersonal, group, and public situations. Recording fee, $2. First Session: Section A—MTWTh 5:45–7:25 pm. Second Session: Section B—MTWThF 1:10–2:30 pm.

11 Voice and Diction (3)

Development of naturalness, correctness, and clarity in conversational speech. Analysis and correction of individual speech delivery faults through tapes and weekly performances. Recording fee, $4. First Session: MTWThF 11:10 am–12:30 pm.

32 Oral Interpretation of Literature (3)

Theory and practice in discovering and communicating orally the meaning in literature through analysis of form and content. Techniques of reading prose, poetry, and drama for listeners. Prerequisite: Sp&D 11. Recording fee, $2. Second Session: MTWTh 5:45–7:25 pm.

45 Understanding the Theater (3)

The art of the theater; its literature, aesthetics, and mechanics. Contributions of the playwright, actor, director, and designer examined through lectures, visiting artists, class discussions, and attendance at theatrical performances. Primarily for nonmajors. First Session: MTWThF 1:10–2:30 pm.

121 Group Discussion and Conference Leadership (3)

Process of thinking and problem-solving in committees and small groups; methods of leading discussions and conferences. Prerequisite: Sp&D 1 or permission of instructor. First Session: MTWThF 8:10–9:30 am.

125 Training the Student Advocate (3)

June 19 to July 24: MTWThF 9:45–12 am. (See High School Forensics Institute, pages 34–35.)

126 Argumentation and Debate (3)

June 19 to July 24: MTWThF 1:10–3:25 pm. (See High School Forensics Institute, pages 34–35.)

151 Stagecraft (3)

Theories and practicum in the technical aspects of production. First Session: MTWThF 11:10 am–12:30 pm.

155–56 **Play Production Practice** (1–1)

Practical work in theater: assigned production duties, special projects under instructor's supervision. May be repeated for a total of 4 semester hours of credit. Admission by permission of instructor. First Session: Sp&D 155; Second Session: Sp&D 156. As arranged.

169 **Introduction to Creative Dramatics** (3)

Study of philosophies and practices underlying dramatics with children; materials and methods for conducting improvised dramatic activities in elementary and secondary education. First Session: Section A; Second Session: Section B. MTWThF 4:10–5:30 pm.

182 **Introduction to Audiology** (3)

June 19 to July 21: MTWTh 2:50–4:30 pm. (See Summer Institute in Speech Pathology and Audiology, pages 38–39.)

184 **Clinical Practice in Speech and Hearing** (1)

Supervised casework in speech and hearing in the University Speech and Hearing Clinic and selected off-campus facilities. May be repeated for a total of 3 semester hours. Prerequisite: Sp&D 183. Both sessions.

277 **Advanced Clinical Procedures in Speech and Hearing** (3)

June 19 to July 21: MTWTh 10:50 am–12:30 pm. (See Summer Institute in Speech Pathology and Audiology, pages 38–39.)

278 **Advanced Clinical Practice in Speech and Hearing** (1)

Both sessions.

291 **Seminar: Speech Pathology** (3)

June 19 to July 21: Section A—MTWTh 9–10:40 am. (See Summer Institute in Speech and Pathology and Audiology, pages 38–39.) Second Session: Section B—Topic: Conditioning in Speech and Language Disorders. As arranged.

292 **Seminar: Audiology** (3)

June 19 to July 21: MTWTh 1–2:40 pm. (See Summer Institute in Speech Pathology and Audiology, pages 38–39.)

294 **Independent Research in Dramatic Art** (arr.)

May be repeated for credit. Both sessions.

295 **Independent Research in Speech and Hearing** (arr.)

May be repeated for credit. Both sessions.

299–300 **Thesis Research** (3–3)

Both sessions.

For information concerning the Summer Institute in Speech Pathology and Audiology and the High School Forensics Institute, see pages 34–35, 38–39.

Statistics

Solomon Kullback, *Chairman*

Departmental prerequisite: one entrance unit in algebra is prerequisite to all first-group courses in Statistics.

Stat 51, 53, and 91 are related in their subject matter, and credit hours for only one of the three may be applied toward a degree. Stat 52 lies outside of this group, and may be taken for degree credit in combination with any one of the other three.

49 **The Language of Statistics** (0)

For doctoral students as a minimum option in lieu of a foreign language. No academic credit. Tuition fee, $240. First Session: MTWTh 5:45–7:25 pm.

51 **Introduction to Business and Economic Statistics** (3)

Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, time series, index numbers. Laboratory fee, $13. First Session: lecture MTWThF 9:40–11 am, laboratory as arranged.

53 **Introduction to Statistics in Psychology and Education** (3)

Frequency distributions, descriptive measures, probability, sampling, estimation, tests of hypotheses, correlation, analysis of variance. Laboratory fee, $13. First Session: lecture MWF 11:10 am–12:30 pm, laboratory TTh 11:10 am–12:30 pm.

91 **Principles of Statistical Methods** (3)

Variables and attributes, averages and dispersion, frequency distributions and their characteristics, regression and correlation, statistical decision processes. Laboratory fee, $13. First Session: lecture MTWThF 1:10–2:30 pm, laboratory as arranged.

97 **Introduction to Computer Programming** (3)

Computer and programming concepts. High-level language programs written by students will be run on the University computer. Laboratory fee, $25. First Session: lecture MWF 6–7:20 pm, laboratory TTh 6–7:20 pm.

*104 **Statistics in the Behavioral Sciences and Education I** (3)

Introductory study of statistical techniques for research problems in behavioral sciences and education. Laboratory fee, $13. Second Session: lecture MTWTh 1:10–2:30 pm, laboratory TTh 2:40–4 pm.

106 **Factor Analysis** (3)

Concepts of factor analysis and their utility in various phases of research and related topics. Prerequisite: Stat 105 or equivalent. Laboratory fee, $13. Second Session: MTWTh 5:45–7:25 pm.

117 **Analysis of Variance** (3)

Introduction to the design of experiments and analysis of variance: random block, factorial, Latin square, and analysis of covariance. Prerequisite: Stat 118. Laboratory fee, $13. Second Session: MWF 5:10–7 pm, laboratory TTh 5:10–6 pm.

* May not be taken for credit by students who have received credit for Stat 51, 53, or 91.

118 **Regression Analysis** (3)

Regression and correlation theory: simple, partial, and multiple. Prerequisite: 3 semester hours selected from Stat 51, 53, 91, 104, 107. Laboratory fee, $13. First Session: lecture MWF 5:10–7 pm, laboratory TTh 5:10–6 pm.

119 **Bases of Statistical Decision-making** (arr.)

For students in the Navy Graduate Financial Management Program only. Introduction to techniques of decision-making, with emphasis on applications rather than theory. June 5 to July 28: As arranged.

155 **Introduction to Probability** (3)

Probability distributions, Bayes' theorem and postulate, mathematical expectation, laws of large numbers. Prerequisite: one entrance unit in algebra. First Session: MTWThF 4:10–5:30 pm.

297 **Seminar: Problems in Mathematical Statistics** (3)

First Session: MWF 3:10–5 pm.

299–300 **Thesis Research** (3–3)

Both sessions.

378 **Seminar: Topics in Econometrics** (3)

Limited to graduate students, primarily for doctoral candidates. A research seminar covering current econometric literature and special topics. Admission by permission of instructor. Second Session: MWTh 6:10–8 pm.

399 **Dissertation Research** (arr.)

Limited to Doctor of Philosophy candidates. May be repeated for credit. Both sessions.

Urban and Regional Planning

D.C. McGrath, Jr., *Chairman*

153 **Principles of Urban Planning and Design** (3)

Studio course for undergraduates. Basic elements of urban planning and design applied to community problems. Survey of planner's role in developing and implementing creative solutions to urban problems. First Session: MTTh 1:10–4 pm.

201 **Introduction to Urban Planning** (3)

Introduction to history, concepts, and activities of urban planning. Discussion of trends in urbanism and the influences of technical and social change. First Session: TTh 6:10–9 pm.

205 **Seminar: Urban Housing** (3)

Examination of the housing problem: housing market characteristics, analytical techniques, national needs, costs, financing, federal programs, technology, rehabilitation, and policy formulation. Second Session: MW 6:10–9 pm.

An interdepartmental course offered by departments of Statistics and Economics.

209 **Urban Transportation Models** (3)

Consideration of land use activity, trip generation and distribution, modal choice models, traffic assignment, and decision-making techniques. Review of detail studies, calibration, interactions, applications, and accuracy limitations of various mathematical models. Prerequisite: U&RP 208, basic statistics; or permission of instructor. First Session: MTTh 8:10–10 pm.

295 **Urban Research** (3)

Directed research and investigation of special problems in community development. May be repeated once for credit. Both sessions.

299–300 **Thesis Research** (3–3)

Both sessions.

APPENDIX: RECENTLY ESTABLISHED REGULATIONS

THE FOLLOWING UNIVERSITY REGULATIONS are under review and may be subject
o change in connection with the establishment of judicial processes. Bulletins
nd handbooks incorporating any changes will be issued as appropriate.

**he following resolution, submitted by the University Senate, was approved by
te University's Board of Trustees on October 19, 1968:**

Whereas, safety and order are essential preconditions of the learning process,
nd indeed of the very concept of a university; and

Whereas, The George Washington University is committed to protection of
ee speech and freedom of assembly, and to safeguarding the right of lawful
rotest on campus; and is committed equally to maintaining the peace and
fety of the campus, in the knowledge that all rights are in jeopardy when
olence and civil disorder prevail over law and reason;

*Now, therefore, be it resolved by the Senate of The George Washington Uni-
rsity:* that in the event a demonstration at this University exceeds the bounds
free assembly and lawful advocacy, and demonstrators are engaging in
lawful acts which cause or imminently threaten injury to persons or property,
which obstruct or interfere with normal and necessary University activities,
s body affirms the authority of the President, or other University officials
ignated to act in his absence, to take such reasonable steps, if possible after
nsultation with the Chairman of the Executive Committee of the University
ate and the President of the Student Body, as are required to restore and
serve order; including, if deemed necessary and appropriate, suspension of
dents or faculty engaging in such acts, and use of such law enforcement
sonnel as are needed to effect the removal, arrest, and prosecution of law
ators. Any such suspension shall be reviewed by an appropriate tribunal
oon after order is restored as is practicably possible.

**following was approved by the University's Board of Trustees on October
1968:**

ny student suspended from The George Washington University on the
nds of exceeding the bounds of free assembly and lawful advocacy shall
his suspension reviewed by the Hearing Committee on Student Affairs
he George Washington University as soon after order is restored as is
icably possible.

The following resolution, submitted by the Student Life Committee, was approved by the University's Board of Trustees on October 19, 1968:

Be it resolved that The George Washington University: affirms its traditional commitment to freedom of expression (a) by continuing to permit business and government organizations which are recruiting employees to conduct their activities at designated places on campus, and (b) by placing no obstacle to students who may wish to protest the presence of such recruiters, provided, however, that such protest shall be orderly and shall not impede or disrupt the recruiter in his activities.

The University affirms its place as a forum for the free exchange of ideas (a) by assuring that guests invited to speak on this campus at duly scheduled meetings shall have the right to appear and to be heard, and (b) by sanctioning the freedom of students to express dissent from the views of the speaker, provided, however, that that expression of dissent be orderly and nonobstructive.

The University distinguishes between orderly protest and resistance-by-obstruction; it accepts the former as a legitimate expression of dissent while rejecting the latter as an abridgement of the freedoms of the individuals who may be its object.

The following was approved by the University's Board of Trustees on October 19, 1968:

The George Washington University is opposed to discrimination based on race, color, or creed. Such discrimination may have appeared in campus organizations in the past. In the future, however, no organization can be recognized or supported by the University unless it provides continued assurance of nondiscrimination in membership practices and in intent, considered adequate by relevant committees and officers of the University.

The following was approved by the University's Board of Trustees on October 19, 1968:

The University cannot condone violations of law, including violation of those laws which proscribe possession, use, sale, or distribution of certain drugs. Members of the academic community should know that administrative action, which may include dismissal from the residence halls, revocation of other privileges, or suspension or dismissal from the University, may be taken in order to protect the interests of the University and the rights of others.

The Board of Trustees reaffirms the responsibility of the President and the Faculty to continue to implement this policy.

The following resolution, submitted by the University Senate, was approved by the University's Board of Trustees on January 16, 1969:

Be it resolved by the Senate of The George Washington University: Any member of the University (including as members of the University all persons having a formal connection with the University)

(a) who engages in conduct that unreasonably obstructs teaching, research, and learning, or

(b) who unreasonably obstructs free access to members or guests of the University or to University buildings, or

(c) who disobeys general regulations of the University, or

(d) who damages University property or injures members or guests of the University,

may be punished for his conduct by dismissal from the University, or by some

lesser disciplinary action, through procedures established within the University for the government of its members.

In order to insure due process, any student subject to dismissal or other disciplinary action on the grounds of violating any of the premises of this resolution shall have, at his discretion, the right of review of the action by the University Hearing Committee on Student Affairs.

ANNUAL ISSUES OF THE UNIVERSITY BULLETIN

Requests for the following publications must include your zip code and should be addressed as indicated.

COLLEGE OF GENERAL STUDIES, Dean of the School

NATIONAL LAW CENTER, Dean of the Center

SCHOOL OF ENGINEERING AND APPLIED SCIENCE, Dean of the School

UNDERGRADUATE AND GRADUATE CATALOGUE (Arts and Sciences, Education, Government and Business Administration, Public and International Affairs), Office of Admissions

SCHOOL OF MEDICINE, Admissions Office, School of Medicine

SUMMER SESSIONS CATALOGUE, Dean of the Summer Sessions

SCHEDULE OF CLASSES: FALL AND SPRING SEMESTERS, Registrar

SCHEDULE OF CLASSES: SUMMER SESSIONS, Dean of the Summer Sessions

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COLLEGES AND SCHOOLS—DEGREE PROGRAMS

COLUMBIAN COLLEGE OF ARTS AND SCIENCES: Associate in Arts (A.A.), Associate in Arts in General Studies (A.A. in Gen.Std.), Bachelor of Arts (B.A.), Bachelor of General Studies (B.Gen.Std.), Bachelor of Science (B.S.), Bachelor of Science in Environmental Health (B.S. in Env.Health), Bachelor of Science in Geodetic and Cartographic Science (B.S. in Geod. and Cart.Sc.), Bachelor of Science in Medical Technology (B.S. in Med.Tech.), and Bachelor of Science in Oceanography (B.S. in Ocea.)

GRADUATE SCHOOL OF ARTS AND SCIENCES: Master of Arts (M.A.), Master of Arts in Special Studies (M.A. in Sp.Std.), Master of Fine Arts (M.F.A.), Master of Music (Mus.M.), Master of Science (M.S.), Master of Science for Teachers (M.S. for Teachers), Master of Science in Forensic Science (M.S. in Forens.S.), Master of Science in Special Studies (M.S. in Sp.Std.), and Doctor of Philosophy (Ph.D.)

SCHOOL OF MEDICINE: Doctor of Medicine (M.D.)

NATIONAL LAW CENTER: Juris Doctor (J.D.), Master of Laws (LL.M.), Master of Comparative Law (M.Comp.L.), Master of Comparative Law (American Practice) (M.Comp.L.(Am.Prac.)), and Doctor of Juridical Science (S.J.D.)

SCHOOL OF ENGINEERING AND APPLIED SCIENCE: Bachelor of Science (Civil Engineering) (B.S. (C.E.)), Bachelor of Science (Electrical Engineering) (B.S. (E.E.)), Bachelor of Science (Mechanical Engineering) (B.S. (M.E.)), Master of Engineering Administration (M.E.A.), Master of Science (M.S.), and Doctor of Science (D.Sc.)

SCHOOL OF EDUCATION: Bachelor of Arts in Education (B.A. in Ed.), Bachelor of Science in Physical Education (B.S. in P.E.), Master of Arts in Education (M.A. in Ed.), Master of Arts in Teaching (M.A.T.), Education Specialist (Ed.S.), and Doctor of Education (Ed.D.)

SCHOOL OF GOVERNMENT AND BUSINESS ADMINISTRATION: Bachelor of Business Administration (B.B.A.), Bachelor of Science in Administration (B.S. in Adm.), Master of Arts in Government (M.A. in Govt.), Master of Arts in Health Care Administration (M.A. in H.C.A.), Master of Business Administration (M.B.A.), Master of Public Administration (M.P.A.), Master of Science in Administration (M.S. in Adm.), Master of Urban and Regional Planning (M. of Urb. and Reg.Plan.), Post-Master's Graduate Certificate in Health Care Administration (Grad.Cert. in H.C.A.), Doctor of Business Administration (D.B.A.), and Doctor of Public Administration (D.P.A.)

SCHOOL OF PUBLIC AND INTERNATIONAL AFFAIRS: Bachelor of Arts (B.A.), Master of Arts (M.A.), and Master of Science in International Affairs (M.S. in I.A.)

1/71—Cornelius—21M

Students registered at George Washington University during the spring semester 1972 should not apply for admission to the Summer Sessions, but should report on June 12 to the first floor of the University Library, where detailed information and the necessary registration materials will be provided.

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